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River of History

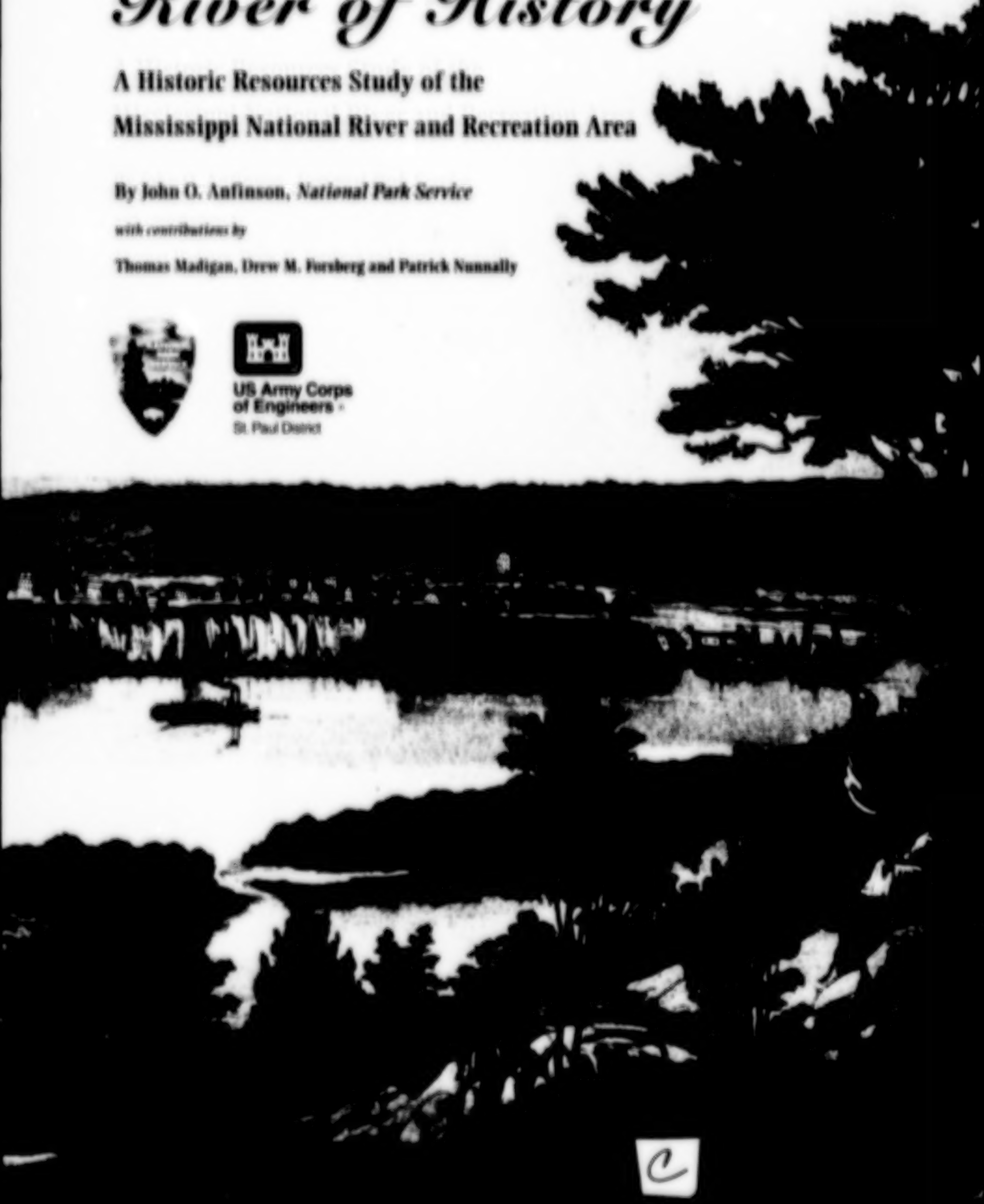
A Historic Resources Study of the Mississippi National River and Recreation Area

By John O. Anfinson, *National Park Service*

with contributions by

Thomas Madigan, Drew M. Forsberg and Patrick Nunnally

US Army Corps of Engineers
St. Paul District



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COVER: *Port of St. Paul, head of navigation, 1853. Steamboats at the Upper and Lower Landings. Artist: Thompson Ritchie. American Memory Project, Library of Congress.*

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Acknowledgments

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Under contract, Susan and Dennis Feigenbaum, Feigenbaum Design Group, provided the design and layout work. Their immense talents have yielded a product that is aesthetically appealing and presents the many historical images with power and clarity.

John O. Anfinson

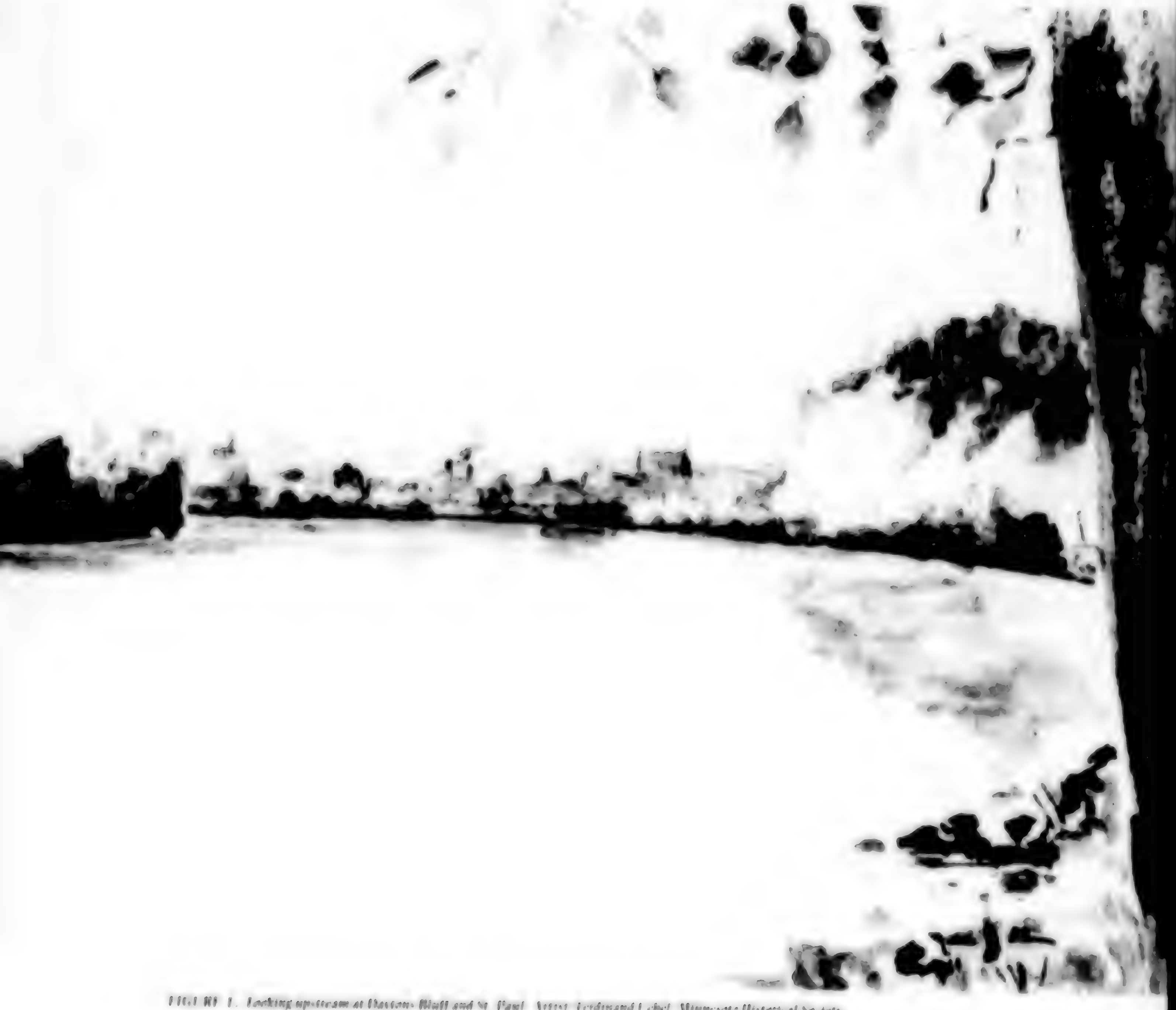


FIGURE 1. Looking upstream at Daytons Bluff and St. Paul. Artist: Ferdinand Lebel. Minnesota Historical Society

Preface

River of History

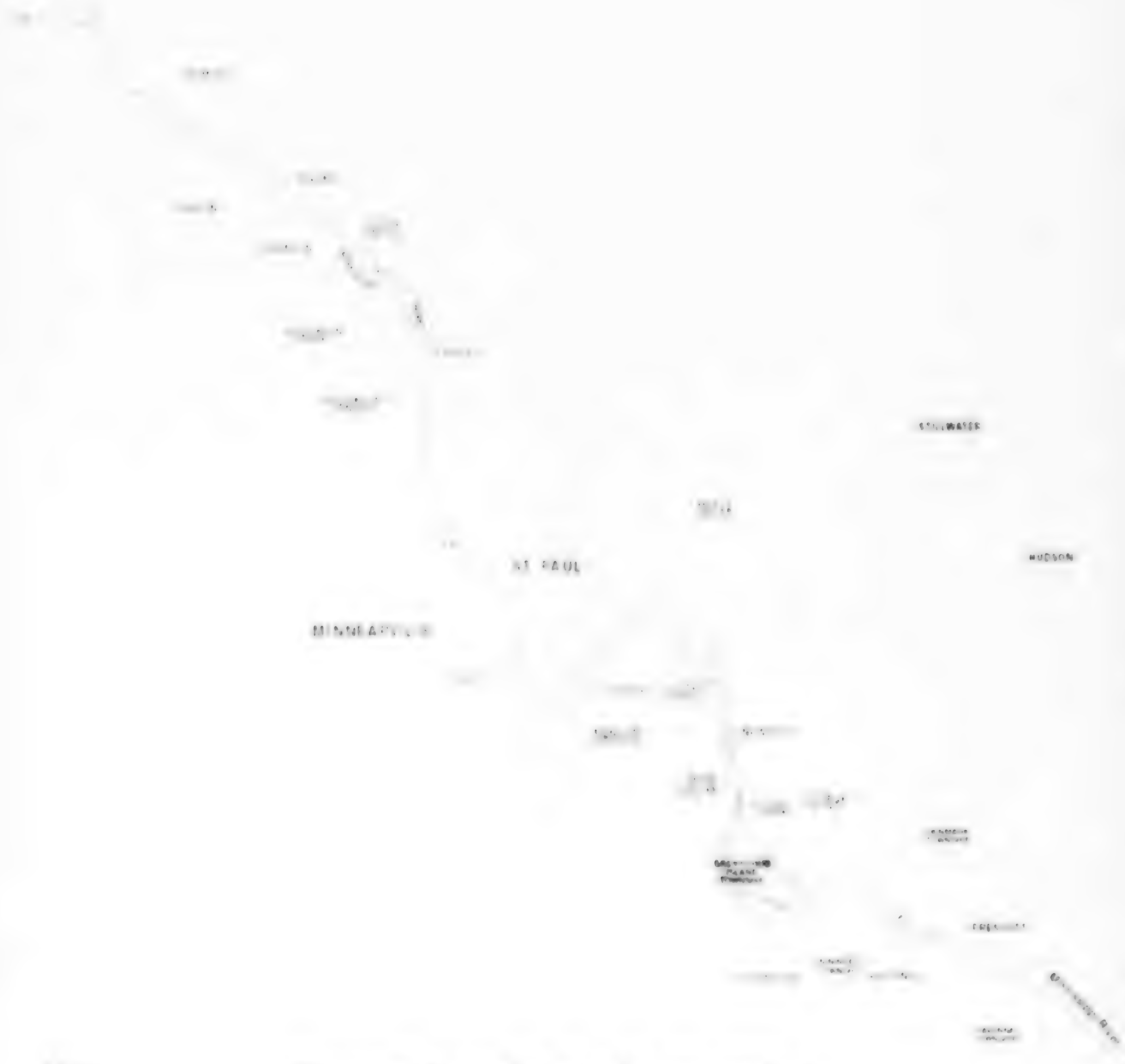
On about March 19, 1680, one hundred and twenty Dakota warriors beached their canoes at the mouth of Phalen Creek, just below downtown St. Paul. Daytons Bluff, with it large, ancient burial mounds, loomed above them to their right. To their left rose the hills and lowlands on which St. Paul rests today. The Dakota had sallied far down the Mississippi River to attack the Miami Indians of Illinois. They returned not with Indian prisoners but three Frenchmen: Michael Accault, Antoine Auguelle and Father Louis Hennepin. The captives had been traveling up the Mississippi hoping to be the first Europeans to discover the river's source and the fabled Northwest Passage, the all water route to the Far East. They were part of an expedition headed by the explorer Robert Cavelier, Sieur de la Salle. De la Salle, however, had been called back from his base camp near Peoria, Illinois, to Montreal, Canada. The Dakota did not give the Frenchmen time to contemplate their landing site, as they destroyed the Frenchmens' canoes and hurried overland to their villages around Mille Lacs Lake.

On July 1, 1680, the Dakota, taking the Frenchmen along, left their villages to hunt buffalo in southwestern Minnesota. Traveling in small groups, they rendezvoused at the Rum River's mouth, at what is now Anoka. Hennepin and Auguelle received permission to continue downstream to find de la Salle, who was to have sent supplies and reinforcements. Accault stayed with the hunters. As they paddled with the current, they came to the great falls of the Mississippi, which Hennepin named for his patron saint, Anthony of Padua. Here they witnessed a Dakota ceremony to Oanktehi, the spirit of the falls. The Dakota pleaded for safe passage and success in their battles and headed downstream. The Frenchmen and some Dakota continued downriver well past the mouth of the St. Croix, but did not find de la Salle. The party then headed back to Mille Lacs. Just below the St. Croix, they met Daniel Greysolon, Sieur du Luth (who later claimed he rescued them). In late September, the Frenchmen left the Dakota.

The encounter between the Dakota and the French marked a new epoch in the history of the upper Mississippi and in the history of what is now the Twin Cities metropolitan area. For 10,000 years Native Americans had had the river to themselves. From March 1680 forward, Europeans and then Americans would increasingly define human interaction and the river's physical and ecological character. The Dakota and their predecessors left many historically important places telling of their presence. Europeans and Americans would begin adding their own places. Transformed though it is, the place below Daytons Bluff where Hennepin, Accault and Auguelle landed is the first of these and deeply historic *(Figure 1)*.

This historic resources study focuses on the archeological and historic resources in that part of the Twin Cities

FIGURE 2. The 72 mile long Mississippi National River and Recreation Area extends from the confluence of the Crow and Mississippi Rivers at Dayton and Ramsey, south to the Vermillion River bottoms in Ravenna Township, just below Hastings.



Mississippi National River and Recreation Area metropolitan area now included in the Mississippi National River and Recreation Area. This 72-mile-long, National Park Service corridor extends from the confluence of the Crow and Mississippi Rivers at Dayton and Ramsey, south to the Vermillion River bottoms in Ravenna Township, just below Hastings (*Figure 2*). It also extends four miles up the Minnesota River valley. The corridor covers some 54,000 acres that are filled with places and stories of local, regional, national, and even international significance.

Congress established the Mississippi National River and Recreation Area (MNRRA) as a unit of the National Park System (NPS) on November 18, 1988 (Public Law 100-696). In doing so, Congress stated: "(1) The Mississippi River Corridor within the Saint Paul-Minneapolis Metropolitan Area represents a nationally significant historical, recreational, scenic, cultural, natural, economic, and scientific resource." And, "(2) There is a national interest in the preservation, protection, and enhancement of these resources for the benefit of the people of the United States."[3] This study expands the story of the MNRRA corridor's significance. It also identifies and provides the context for many sites of local and regional significance, sites that illustrate processes and events that tell much about our national development.

Acknowledging the importance of the corridor's cultural resources, the Mississippi River Coordinating Commission (a MNRRA planning commission established by Public Law 100-696 and which sunset in November 1998) dedicated three of its six guiding purposes to the identification, preservation and enhancement of such resources.

> "PURPOSE: *Preserve, enhance, and interpret archeological, ethnographic, and historic resources.*"
>
> "PURPOSE: *Improve the public's understanding of the river and promote public stewardship of its resources.*"
>
> "PURPOSE: *Recognize and strengthen people's relationships with the river as a dynamic part of our heritage, our quality of life, and our legacy for future generations.*"[4]

The significance of historical and cultural resources in the first purpose is clear. Understanding the river better and caring for its resources will follow from knowing the river's history and the role various places and sites have played in that history. Likewise, knowing the river's history, knowing what "a dynamic part of our heritage" it has been, will lead more people to care for it and realize what a legacy it is and will continue to be.

Within the NPS, a historic resources study is done for each unit of the National Park system. According to NPS guidance, "A historic resource study provides a historical overview of a park or region and identifies and evaluates the park's cultural resources within historic contexts."[5] Historic context defines a site's significance. This study cannot provide the specific context for every historic site in the corridor; there are far too many. The goal is to offer general contexts in which we can place most of the corridor's sites. Some contexts are more thoroughly examined than others.

The historic resources study is also supposed to "synthesize all available cultural resource information from all disciplines in a narrative designed to serve managers, planners, interpreters, cultural resource specialists, and interested public as a reference for the history of the region and the resources within the park."[6] To gather all available cultural resources information for the MNRRA corridor and synthesize it will take many years. We have compiled an inventory of all known archeological and historic sites within the corridor as of January 1998, which will be available from the Minnesota Historic Preservation Office on a need-to-know basis. Historic preservation law protects specific site locations, but they are generally available to planners and cultural resources specialists as needed. The Minnesota Historical Society's Historic Preservation Office is the repository for site locations. Each chapter of this study provides a reference for the history of the region and the corridor and offers both specific and general information on the corridor's resources. Overall, the study is written for a general audience.

Chapter 1, literally and figuratively, establishes the foundation of the MNRRA corridor's history, for the corri dor's geologic history has clearly defined its human history. This chapter explains why the Mississippi River has three dramatically different reaches in the corridor. The upper reach runs from St. Anthony Falls north to Dayton and Ramsey. Here the prairie used to run up to the river. No imposing bluffs line the riverbanks. No sprawling flood plain spreads across the valley floor. Below the falls down to St. Paul, the Mississippi enters its most confined reach on the entire river. This stretch is known as the gorge. Here the bluffs crowd in against the river, allowing little room for a floodplain. Below St. Paul the bluffs get higher and spread apart, hinting at the force created by the glacial River Warren as it sculpted the Minnesota River Valley and the Mississippi River Valley below the Minnesota River's mouth. Here, surviving fragments of the broad floodplain are ecologically rich. In some places along the corridor, geologic layers, millions of years old, lay exposed to see and touch.

As the last glaciers retreated, Native Americans began occupying the MNRRA corridor. While little evidence of their earliest presence remains, there is enough to say they were here. Chapter 2 reviews over 12,000 years of Native American history. Important archeological sites exist within the MNRRA corridor that provide glimpses of life along the Mississippi before Europeans arrived. The burial mounds on Daytons Bluff occupy one of the most dramatic settings in the corridor. Excavated in the nineteenth century, the mounds contained artifacts associated with the well known and widespread Hopewell Culture (belonging to the Middle Woodland Era, which dated 2,000 to 1,500 years before the present (B.P.)). The Institute for Minnesota Archaeology Consulting wrote Chapters 1 and 2 on contract.

Native American life and the Mississippi River's ecosystems in the MNRRA corridor would change dramatically as Europeans and Americans entered the region. After Father Hennepin's visit in 1680, French fur traders spread quickly through the region, followed later by British and American explorers and fur traders. Traders introduced guns and other goods that upset the balance of power. They induced the Chippewa, Dakota and other tribes to focus on the beaver, muskrat and other fur bearing animals, changing in fundamental ways their traditional economies and spurring the decimation of many species. The most striking changes would come after the Americans established their sovereignty in 1815. In only 36 years, the Americans forced most of the Dakota out of the MNRRA corridor. Covered in Chapter 3, the events of this era (1680-1851) represent national and international events and processes.

In 1823 the *Virginia* became the first steamboat to paddle up the Mississippi River from St. Louis to St. Paul. In doing so, it signaled a new era. Now traders and settlers could enter the region much more quickly and in greater numbers. As the Dakota and Chippewa lost their lands in the Treaties of 1837 and 1851, pioneers swiftly moved in. The Mississippi was the settlers' primary highway from and to the rest of the world, and they began calling for navigation improvements before the Civil War, with little success. Following the war, as railroads expanded across the river and throughout the region, settlers demanded navigation improvements to provide competition and hopefully reduce railroad rates. Their successful efforts to win navigation projects tie the Twin Cities and the MNRRA corridor to large regional and national events. For this reason and because these projects would physically and ecologically transform the Mississippi River more than any force since the glaciers, this study devotes two chapters (4 and 5) to navigation improvements.

In 1866 Congress authorized the Corps of Engineers to begin dredging, removing snags and clearing trees back from the river's banks. While this work helped, it was not enough to make the Mississippi a reliable highway for commerce. Responding to a national movement for railroad rate control and regional efforts to make the river a competitive alternative to railroads, Congress authorized the 4½-foot channel in 1878. To achieve this depth, the Corps used wing dams and closing dams. The wing dams, made of rock and brush, projected into the river from the shoreline. They focused the river's current into a single channel, like the nozzle on a garden hose being tightened down, so it could scour away sandbars. Closing dams blocked side channels, directing all available water to the main channel. By 1906 channel constriction (as the Engineers called this work) had radically altered the river's landscape and ecosystems from St. Paul to St. Louis. By 1907, the Corps had completed the Meeker Island Lock and Dam and had begun work on Lock and Dam No. 1. These dams, both above St. Paul, would change the river's flow and appearance up to St. Anthony Falls. Chapter 4 examines the movements for the various navigation projects and the effect these projects had on the river.

Navigation boosters did not stop with these projects. In 1907, they convinced Congress to authorize the 6-foot channel project. Under this project the Corps added more wing dams and closing dams, raised the height of old dams, and extended some wing dams farther into the channel. The river between Hastings and St. Paul became one of the most intensely constricted reaches on the upper Mississippi. Still, railroads drew traffic away from the river. So navigation boosters pushed for more locks and dams. Congress again responded to the calls for navigation improvement. In 1917, the Corps completed Lock and Dam No. 1 near the Minneapolis-St. Paul border, and in 1930, the Corps completed Lock and Dam No. 2 at Hastings. These dams permanently changed the river's physical and ecological character. While Lock and Dam 1 allowed boats and barges to reach St. Anthony Falls, Minneapolis navigation boosters had long hoped to get the boats above the falls, where terminals would not be hemmed in by the bluffs of the gorge. The Upper Harbor Project fulfilled the city's dream. Under this project, the Corps finished the Lower St. Anthony Falls Lock and Dam in 1956 and the Upper St. Anthony Falls Lock in 1963. Chapter 5 examines the history of these projects.

The most dramatic physical and ecological changes in the Mississippi River occurred from St. Anthony Falls downstream. Private interests, however, built one important structure above the falls. Completed in 1914, the Coon Rapids Dam has a unique history and physically segments the upper corridor. The dam lies at river mile (RM) 866.3, approximately 16.7 miles above St. Anthony Falls (RM 853.9). To build the dam, the Northern Mississippi Power Company established a camp, a "little city," on the Mississippi's east bank in 1913. "Streets were laid out; a store, clubhouse, hospital, office buildings, school, dormitories, new houses, carpenters shops and storehouses were built." As the city met and exceeded the prediction of 1,000 workers, the company added a movie theater, dance hall and billiard parlor.' Chapter 5 looks briefly at this history, as well.

St. Anthony Falls anchors the MNRRA corridor's national significance. The only large cataract on the Mississippi River, St. Anthony was a place of spirituality and power to Native Americans. To early explorers it became a "landmark in the wilderness." To settlers it represented a different kind of power, a power that when captured would become the economic foundation of a milling center to rival any back East. In this role, St. Anthony would make Minneapolis into the nation's leading lumber and flour milling center. Chapter 6 examines the history of St. Anthony Falls from its birth in St. Paul over 12,000 years ago through its heyday as a timber and flour milling hub to its abandonment after 1930.

Chapter 7 outlines the MNRRA corridor's economic development from flour and timber milling to brick making and beer brewing. It also surveys the development of the corridor's multi-modal transportation system and how that system changed the Mississippi and the relation of the area's people to the river. Unlike Chapter 6, which focused on economic development at St. Anthony Falls, Chapter 7 looks at the growth of business and industry from Dayton and Ramsey to Hastings. The MNRRA corridor's economic history is far too broad and varied to be covered in depth in any one chapter. The purpose of this chapter is to provide an overview of significant events and developments.

Flour and timber milling were important not only at the falls; most communities in the corridor had mills during their earliest years. Flour and timber milling were not the only regionally and nationally significant businesses. At least three nationally recognized beers had their start in Minneapolis and St. Paul. Grain trading and the stockyards in St. Paul also attracted or yielded nationally recognized firms such as Cargill, Peavey, Swift, Armour, Cudahy and Wilson.

Flour and lumber milling, grain shipping, the stock yards, brewing, and other industries depended upon the river, at least initially. The river's geologic history defined where these businesses located. Millers used the river for transportation and power and to carry their wastes away. Shippers depended upon the river to haul their grain or to provide an alternative to railroads as a way to keep rates down. The stockyards, to the chagrin of people downstream and to the detriment of the river's ecosystems, cast animal wastes into the Mississippi. And brewers used the valley's natural sandstone caves or excavated their own tunnels and caverns into the bluffs to store their beer. All of these aspects of economic history are discussed in Chapter 7.

Chapter 8 focuses on the process of urban growth in the MNRRA corridor. It examines what towns began where, when and why. It is not and cannot be a history of every community, every riverfront neighborhood, along the MNRRA corridor. Urban history in the MNRRA corridor is intimately tied to the history presented in preceding chapters. Geology and geography, the Native American presence, exploration and early military objectives, navigation improvements and economic activities all played a role in determining where towns located, how fast they grew, and how they related to the river. So the corridor's urban history draws on all these stories.

Some chapters in this study are more complex than others, depending upon your background. Chapter 1, on MNRRA's geology, and Chapter 2, on Native American prehistory, present many terms and information unfamiliar to most readers. We have tried to soften the jargon, but some is necessary. You do not need to read this study from beginning to end. However, the early chapters provide a foundation upon which subsequent developments make more sense.

The results of this study reaffirm Congress' decision to establish the Mississippi National River and Recreation Area. From the glacial River Warren to the latest lock and dam, this area harbors places with stories so rich and important they define who we are as a people, where we have come from, what we have to celebrate, and what we painfully cannot forget. The remnants of Native American villages, early European and American sites, and existing structures are more than archeological artifacts, wood, concrete or steel. They embody the local, regional and national trends or events that gave birth to them. They tell stories about the dreams and desires people in the Midwest have harbored since the region's beginnings and about how those dreams and desires shaped the region and reshaped the river.

The Mississippi National River and Recreation Area, National Park Service and the St. Paul District, Corps of Engineers jointly produced this study. The study fulfills important historic preservation requirements for both agencies and will help both manage the Mississippi River better.

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River of History

A Historic Resources Study of the Mississippi
National River and Recreation Area

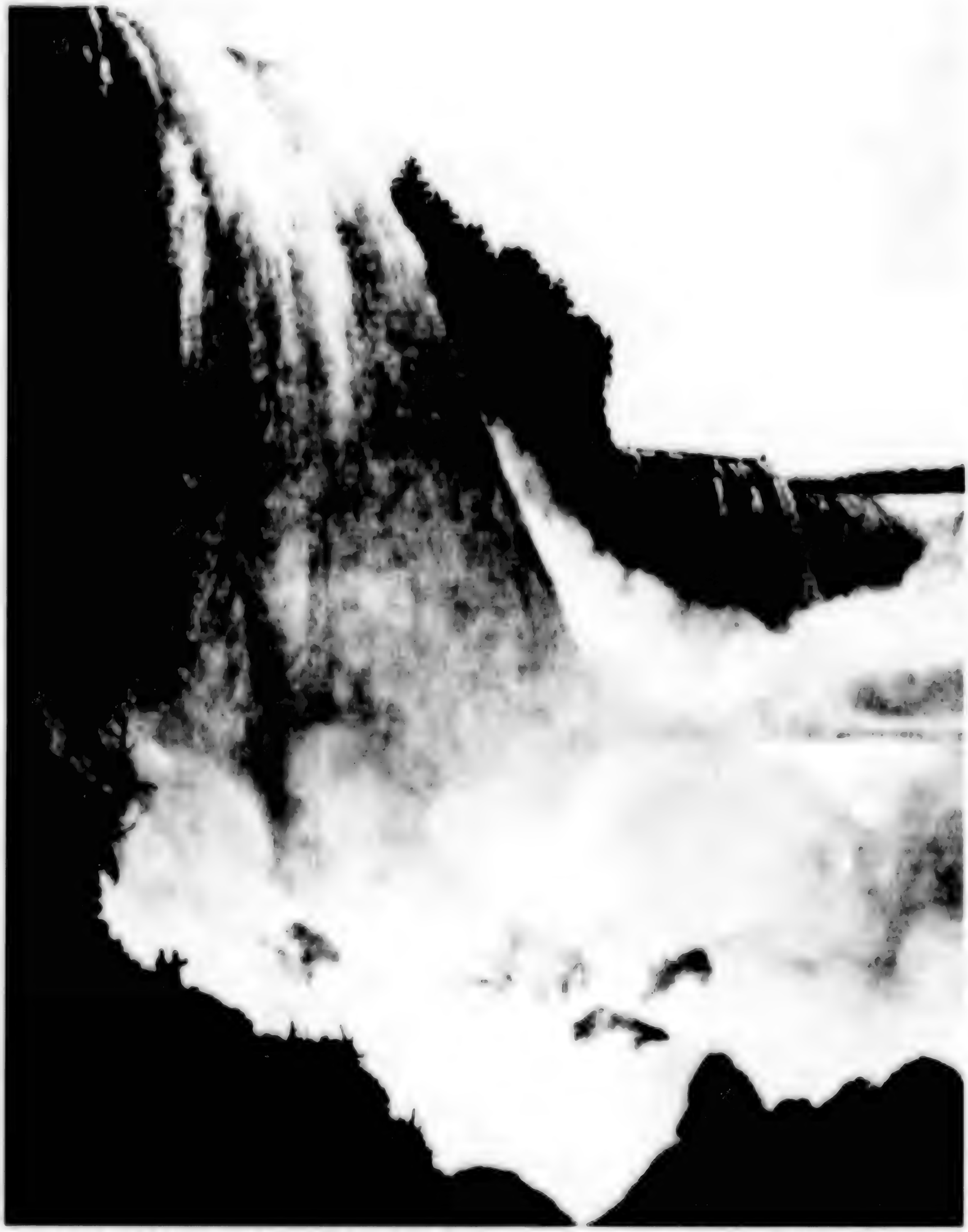


FIGURE 1. What the Glacial River Warren Falls might have looked like in St. Paul 12,000 years ago. Gustav Grunewald, Horseshoe Falls from below High Bank. Fine Arts Museums of San Francisco. Gift of John Davis Hatch, V, in memory of John Davis Hatch, A.I.A., architect of San Francisco, 1996.52.2.

Chapter 1

The Geology of the MNRRA Corridor

Thomas Madigan • Hemisphere Field Services, Inc.

This chapter is about foundations. As subsequent chapters show, landforms created thousands to millions of years ago shaped the corridor's development. Native American villages, early American settlements, milling sites, locks and dams, railroads, roads and modern urban expansion overlay or responded to ancient geologic processes. A cursory glance at the present-day Mississippi River valley reveals that the geologic processes operating during the valley's formation were much different from those of today. This chapter summarizes the current knowledge regarding the physical history of the Mississippi River valley. It includes a brief introduction to some of the early studies of the valley's geology, an overview of the valley's geologic configuration, and a summary of geologic events responsible for the valley's appearance today.

The Mississippi River winds more than 2,300 miles across the heart of the nation on its course to the Gulf of Mexico. In Minnesota, the river flows over 660 miles from its source at Lake Itasca through bogs and spruce forests in the glaciated northern region, across fertile agricultural fields in the central portion of the state, then southeastward through scenic bluff country. Along this course the river's character varies dramatically, due to the geologic events.

The Mississippi River, within the MNRRA corridor (*Figure 2*), cuts through a sequence of sedimentary rocks, revealing a geologic history spanning over 500 million years. Spectacular bedrock bluffs are common along the river between St. Anthony Falls and Hastings. The Crow River, which marks the corridor's northern boundary, occupies an ancient glacial river channel that drained into the Mississippi. Between Dayton and Minneapolis, the river has developed on thick layers of sediment deposited during the last glacial era. Glacial sediment borders the river south of Dayton and large deposits of sand and gravel form flat-lying terraces along both sides of the river south to the confluence of the Minnesota River. Below Minneapolis, the Mississippi is cut into flat-lying, 570- to 450-million-year-old Paleozoic sedimentary rocks. Throughout the stretch from Dayton to the Minnesota River, the valley is relatively narrow and floodplain development limited.

Near Fort Snelling, the Minnesota and Mississippi Rivers join, and consequently the Mississippi valley becomes much wider. Glacial River Warren, predecessor to the Minnesota River, carved out the river's wide valley, as it carried the meltwater pouring from glacial Lake Agassiz, between 11,800 and 9,200 years before the present (B.P.). Since that time, sand, silt, and clay have been filling the valley, forming a complex mosaic of landforms across the floodplain.

Downstream from the confluence, the Mississippi heads northeast toward downtown St. Paul, bordered on

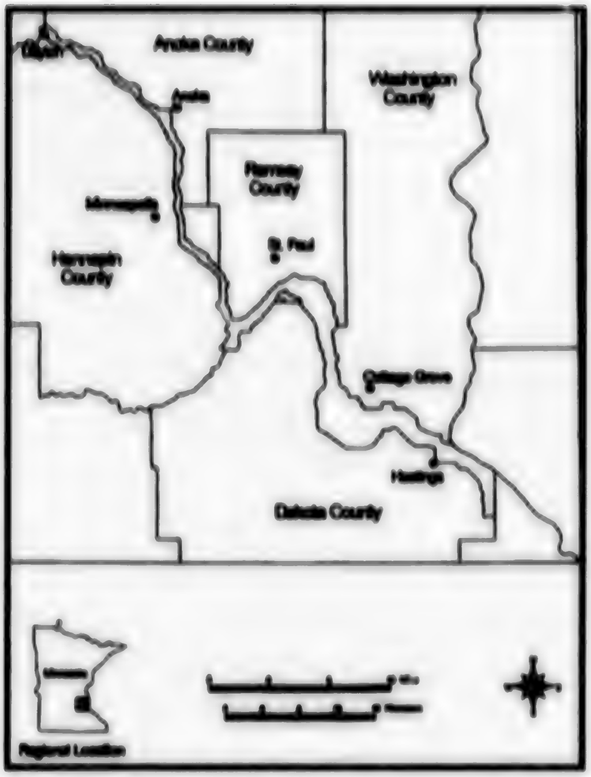


FIGURE 2. The Mississippi National River and Recreation Area located in the Twin Cities metropolitan area.

both sides by glacial terraces lying more than 100 feet above the floodplain. In this reach, glaciers did not erode the bedrock subsurface as severely. Therefore, glacial sediments are thin and terraces developed over the bedrock surface, unlike the braided outwash types occurring upstream. Going south, however, the glacial deposits form a belt of hummocky topography containing numerous depressions and lakes, typical of a recently glaciated landscape.

Just past downtown St. Paul, the Mississippi makes a wide arc and turns southward. At this point the river enters its preglacial valley, where spectacular bluffs expose the ancient bedrock. As the river winds southward toward Cottage Grove, the valley widens dramatically, due to erosion that occurred before the last glaciation. During the last glacial maximum (the farthest the glaciers advanced), this part of the river valley filled with sand and gravel deposits forming a broad level surface at an elevation of about 120 feet above the modern floodplain.

Today the Vermillion River joins the Mississippi at Hastings, forming a large alluvial fan and diverting the channel of the Mississippi to the northeast. Alluvium accumulating on the floodplain near the confluence has formed a delta in the Mississippi that has been migrating downstream for the last 9,500 years. Backwater lakes and sloughs, meandering secondary channels, and small terrace remnants characterize the floodplain at the southern end of the MNRRA corridor. This area was once part of Lake Pepin, the large river lake downstream, and at one time may have extended up to St. Paul.

Early Investigations

The first studies into the geologic history of Minnesota began in the 1870s under Newton H. Winchell, at the newly formed Minnesota Geological and Natural History Survey. Winchell, with the aid of Warren Upham, began mapping and describing the surface geology in central Minnesota. Most of the surface features in the area developed in response to continental glaciation during the last two million years (Quaternary Period), and their form provided clues to the processes that helped shape them. However, because of the scarcity of subsurface information regarding glacial stratigraphy and lack of adequate base maps covering the area, a complete understanding of the complex glacial history was never fully realized.

Although the details of Minnesota's geologic history were not fully known, perhaps some of the most important investigations into the history of geologic development of the Mississippi River were completed at this time. Winchell was the first to address the retreat of St. Anthony Falls from its former position at the confluence of the Mississippi and Minnesota Rivers upstream to its present location.[1] Using the final ice retreat from Minnesota as a basis he estimated that it took approximately 7,800 years for the waterfall to retreat, a figure that has proven remarkably close to current estimates. Upham conducted a detailed study of glacial Lake Agassiz, whose outlet stream, glacial River Warren, had a profound effect on the Mississippi River valley's shape and configuration. His work led to the publication of a huge monograph detailing Lake Agassiz's development and drainage.[2]

The Minnesota Geological and Natural History Survey officially ended in the early 1900s following the retirement of Winchell and Upham. Shortly thereafter, Frank Leverett, with the aid of Frederick Sardeson, began studying the glacial history of Minnesota. Leverett and Sardeson used much of Upham's earlier work in their reevaluation of Minnesota's surface geology.[3] Leverett first recognized that multiple glacial advances formed the region's glacial deposits, and each subsequent advance created numerous deposits, containing distinct landforms.[4] The work completed during this time period was a major step forward in recognizing the complexity of the Upper Midwest's glacial history.

In addition to his work in glacial geology, Sardeson mapped and described fossils contained in the bedrock outcropping along the Mississippi River valley in southeastern Minnesota.[5] Sardeson also reevaluated Winchell's original estimate of retreat for St. Anthony Falls by considering the geometry and thickness of the limestone cap rock.[6] His calculation of 8,000 years is even closer than Winchell's to the current estimate of 10,000 years, which is based on radiocarbon dating.[7]

W. S. Cooper evaluated the sequence of glaciation in central Minnesota and its relation to the formation of the Mississippi River during Late Wisconsin and postglacial time.[8] His work detailed the origin of the Anoka Sand Plain in east central Minnesota, which formed when an advancing ice lobe diverted the Mississippi River's flow southward. A portion of the MNRRA corridor, between Dayton and Fridley, occupies the sand plain.

From the early 1950s to the 1980s, many studies of Minnesota's glacial geologic history were conducted. Herb Wright, Jr., his colleagues, and students at the University of Minnesota completed most of them. Each study shed new light on the complexities of the glacial sequence in Minnesota and how the glacial sequence relates to development of the Mississippi River valley.

More recently, the Army Corps of Engineers, St. Paul District has sponsored geomorphological investigations along various portions of the Mississippi River valley in conjunction with cultural resource investigations. The studies have focused on detailed mapping of surficial landforms within the floodplain environment in an effort to predict the location of buried archaeological sites. On the basis of information from these studies, it has become apparent that the Mississippi River floodplain is a dynamic environment with an ever changing set of resources. Archaeological site distribution is a function of resource availability during the time of occupation, and geomorphic processes operating on the floodplain influence the potential for site preservation.

General Geology

Bedrock Geology • Southeastern Minnesota, wherein the MNRRA corridor lies, is composed of gently dipping sedimentary rocks that form a plateau. The Mississippi River and its tributaries have eroded this plateau extensively. Because glacial deposits have buried the bedrock, few outcrops appear along the Mississippi River above St. Anthony Falls. However, deep incision by the river below the falls has exposed the bedrock in the valley walls. The rock formations were deposited during the Cambrian and Ordovician periods (570-438 million years B.P.), when shallow seas covered southeastern Minnesota and the surrounding region. Sand accumulated along the shoreline in beaches and bars, where wave action constantly reworked it. Silt and clay formed in mud flats or settled out of relatively quiet water offshore. Calcium carbonate accumulated from the remains of biologic organisms in coral reefs and as large layers on the sea floor. The sediments eventually became compacted and cemented to form sandstone, shale, limestone, and dolomite.

The high bluffs along the river, locally averaging from 100 to 400 feet in relief, have resisted weathering and erosion. Limestone and dolomite units are strong and usually form steep cliffs adjacent to tributary stream valleys. Shale and poorly cemented sandstone are easily eroded, forming more gentle slopes along the valley sides. Glacial processes removed much of the bedrock in the Twin Cities area. Ice followed topographic low area in the bedrock, carving out valleys during advance across the area. Stream erosion and deposition also played a major role. Glacial meltwater, flowing from the retreating ice masses, cut the valleys wider and deeper. After the glacial meltwater slowed and disappeared, the valleys gradually began filling with sediment derived from the erosion of upland surfaces.

Bedrock has been an important factor in determining the valley width, the location of glacial terraces, and the course of the Mississippi River. Valley width is controlled largely by the sedimentary properties of the bedrock. Where the river intersects more resistant carbonate units, the valley is narrow. Where poorly cemented sandstone units occur, stream flow has more effectively eroded the valley, resulting in a much greater width. Consequently, late glacial outwash terraces generally occur on top of carbonate units and occupy areas where erosion cut away the sandstone. Also, floodplain development is more extensive in areas that have greater valley width.

Each bedrock unit has a distinct set of physical characteristics setting it apart from adjacent units. From oldest to youngest, the bedrock units are: the Jordan Sandstone, Prairie du Chien Group, St. Peter Sandstone, Glenwood Shale, Platteville Limestone, Decorah Shale, and Galena Group *(Figure 3)*. A brief description of the major bedrock formations outcropping in the MNRRA corridor is presented below. The Jordan Sandstone (515-505 million years B.P.) is the oldest bedrock unit outcropping within the park boundaries. Exposures are few, however, and occur only along Spring Lake near Nininger Township in the southern portion of the MNRRA corridor. The unit is a generally white, massive to well-bedded, commonly cross-bedded sandstone. Total thickness of the Jordan Sandstone is unknown, but it may be as much as 80 to 90 feet in the area around Cottage Grove.[10]

Overlying the Jordan Sandstone is the Ordovician Prairie du Chien Group (505-458 million years B.P.), which appears along the Mississippi River channel near South St. Paul, and in the bluffs at Hastings, forming an extensive flat-lying plateau across the upland areas. The Prairie du Chien is divided into two formations on the basis of variations in sedimentary properties. At the base of the group, the Oneota Dolomite is a light gray to buff tan, medium-grained, thinly-layered to massive dolomite. Lying above the Oneota is the Shakopee Formation, which consists of two members. The New Richmond member is a light gray, fine-grained dolomitic to glauconitic sandstone, and the Willow River member is a bluish gray dolomite similar in nature to the Oneota dolomite. Total thickness of the group ranges from 100 to 300 feet throughout the MNRRA corridor.[11]

One of the most extensively exposed bedrock units in the upper Mississippi River valley is the St. Peter Sandstone (458-455 million years B.P.). Exposures of this rock type are common in bluffs throughout the northern half of the MNRRA corridor. The St. Peter Sandstone consists of white to yellow, medium-grained, friable quartz sand. Because of its poorly cemented nature, the sandstone is easily eroded. On the basis of information obtained from wells in the area, total thickness of the St. Peter is approximately 150 feet.

The thinnest bedrock unit outcropping in the bluffs of the Mississippi River is a greenish gray, thinly bedded, sandy shale called the Glenwood Formation (455 million years B.P.). On average, the Glenwood ranges from 3 to 5 feet in thickness, and in some places is entirely absent. The Glenwood Shale, when present, is easily identified as a small seam of highly weathered bedrock between the underlying St. Peter Sandstone and overlying Platteville Limestone.

Possibly the most recognized bedrock formation, and one that forms relatively flat-topped benches and mesas along the Mississippi River, is the Platteville Limestone (455-454 million years B.P.). In general, the Platteville is a light gray to buff tan, thinly bedded, dolomitic limestone. Because of its highly resistant nature, the limestone serves as a caprock that

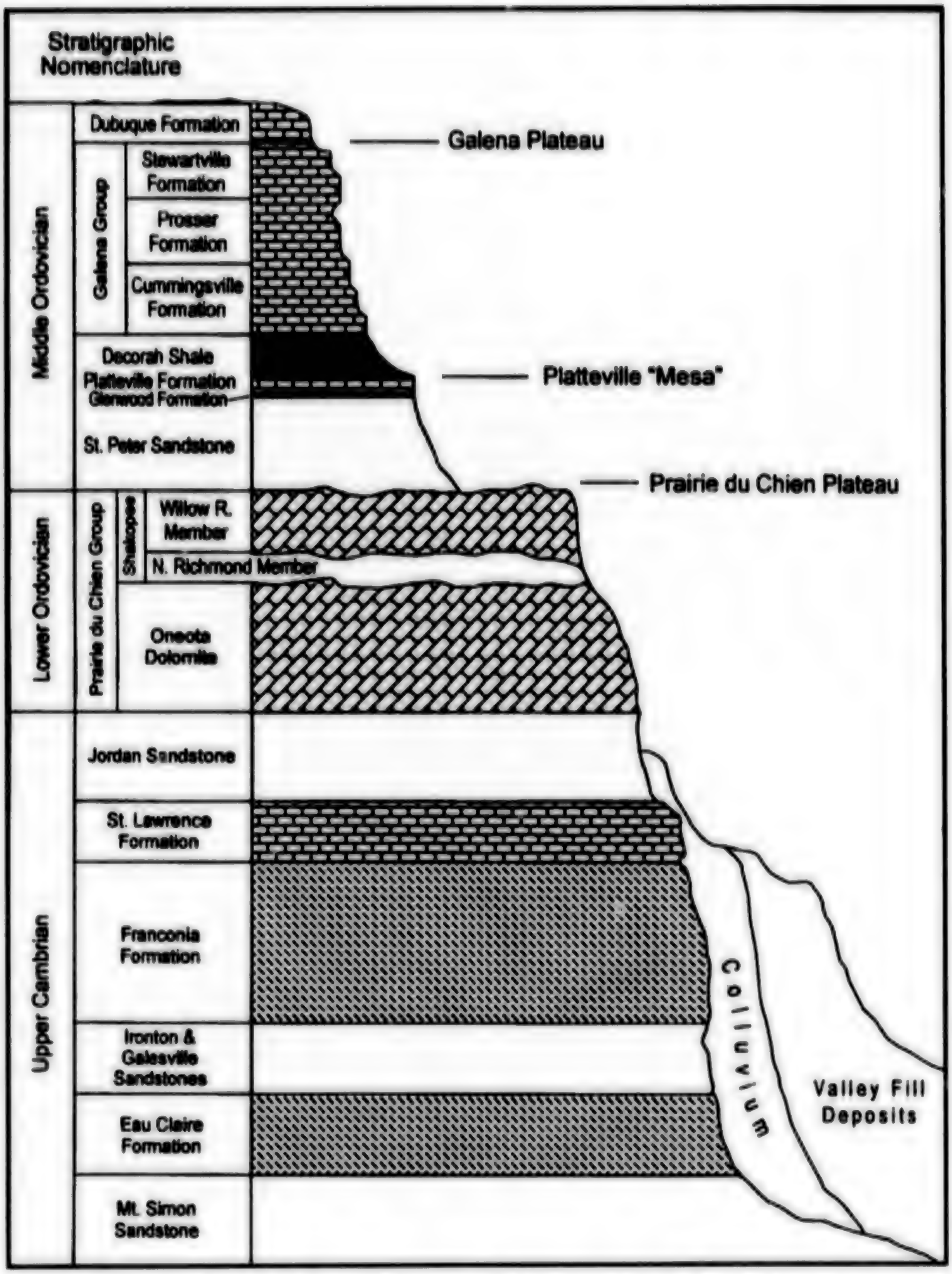


FIGURE 1. Generalized bedrock stratigraphy of the upper Mississippi River valley in southeastern Minnesota. Redrawn from Hobbs.

is partially responsible for controlling the rate of retreat and location of waterfalls within the MNRRA corridor.

Lying above the Platteville is the Decorah Shale (454 million years B.P.), a greenish gray, calcareous shale containing thin limestone interbeds. The lateral extent of this bedrock unit across the area is limited, but it does outcrop in bluffs along the Mississippi River in St. Paul above Pickerel Lake.

The uppermost bedrock unit exposed in the MNRRA corridor is the Galena Group (454-450 million years B.P.), consisting of three members: Cummingsville Formation; Prosser Formation, and Stewartville Formation. Only the lower part of the Cummingsville is exposed within the MNRRA corridor (in southeastern Minnesota the entire Galena Group forms an extensive plateau across the uplands).

Surficial Geology • Surficial geologic deposits occurring within the MNRRA corridor can be separated into two general categories on the basis of their relation to the geologic history of the area. The first group, nonglacial deposits, consists of sediments that are accumulating in upland areas and along the river floodplain in response to the present geomorphic agents operating on the landscape. The second group, deposits related to glaciation, consists of sediments that were deposited during the advance and retreat of glaciers across Minnesota.

Nonglacial surficial deposits consist of three main types: organic sediments; river alluvium, and colluvium. Each deposit has a distinct environment of deposition, spatial location, and morphological expression on the landscape.

Organic deposits consist of plant material and fine-grained sediment in sloughs, lakes, and poorly drained depressions occupying the floodplain, or on upland surfaces. Plant litter continually collects at the surface, trapping silt and clay brought in by wind or fluvial activity. Soils formed from organic deposits are dark colored, water saturated, and have a mucky consistency.

Alluvium is the accumulation of sand, silt, and clay deposited by streams on riverbeds, floodplains, and alluvial fans. The deposits often exhibit complex sedimentary properties and display a highly variable internal stratification. Individual landforms created by stream processes include point bars, cutbanks, natural levees, terraces, and numerous backwater features.

Colluvium is the unsorted mixture of weathered bedrock in a matrix of sand, silt, and clay flanking the hill slopes and cutbanks along the river valley. Colluvial deposits generally consist of two units: an upslope unit consisting of small boulders in a matrix of sediment eroded from upland areas, and a downslope unit containing large masses of bedrock slumped off the valley wall in a matrix of fine-grained sediment.

The second group of surficial deposits, those related to glaciation, consists of outwash and till deposited during the Great Ice Age. Glacial till is the unsorted mixture of pebbles, cobbles, and boulders in a matrix of sediment deposited directly from glacial ice. The compositions of rock types found in the till provide clues about the source of the deposits. Outwash typically consists of sand and gravel laid down by glacial meltwater streams flowing across the surface. Many outwash deposits consist of broad terraces that were once large braided streams draining the front of an ice sheet.

The complexity of the surficial landscape within the MNRRA corridor reflects the geologic processes operating on the surface throughout time. Many of the surficial geologic features formed in response to continental glaciation, which had a direct impact on the development of natural resources that are part of the present-day landscape.

Glacial History of the Mississippi River

The upper Mississippi River valley has experienced a complex series of geological events since the beginning of the Quaternary Period. The Quaternary Period is divided into two formal geologic periods: the Pleistocene and Holocene Epochs. The Pleistocene, known as the Great Ice Age, spans from two million years to 10,000 years B.P. Four major ice advances are known to have taken place during the Great Ice

Age, and each has been given a name based on the geographic location of characteristic glacial deposits associated with the advance. For simplicity, the following discussion ignores the first three named glacial advances and uses the term pre-Wisconsin for glacial geologic events occurring prior to 35,000 years B.P. The Wisconsin Glaciation, spanning from about 35,000 to 10,000 years B.P., dramatically altered the landscape of Minnesota. The Holocene, or Recent Epoch, represents the last 10,000 years of geologic time.

Most of the present day landforms developed during the multiple glacial episodes that occurred during the Wisconsin Glaciation. In Minnesota the sequence of glaciation had a direct impact on the development of the MNRRA corridor. Therefore, an overview of the glacial history of Minnesota is necessary to provide a context for discussing geologic development of the river in the MNRRA corridor.

Pre-Wisconsin Glacial History • In Minnesota, early glacial events within the valley have largely been obscured by late glacial and post glacial events. However, exposures of pre-Wisconsin drift occur at the surface in Washington and Dakota Counties. Near the Mississippi River valley the upland landscape consists of gently rolling hills topped by a thin veneer of glacial drift or weathered bedrock residuum. A system of well integrated stream networks, forming a dendritic (branch-like) pattern across the region, drains the uplands. Erosion along stream valleys has exposed a considerable amount of bedrock.

It is uncertain when the upper Mississippi River valley initially formed. However, on the basis of present geologic evidence, deep cutting must have occurred during the early Pleistocene. The presence of glacial till in southeastern Minnesota, deposited during a pre-Wisconsin glacial advance, supports the theory of an early Pleistocene beginning. The course of the upper Mississippi River along the margin of the Driftless Area of southeastern Minnesota is believed to have been established during pre-Wisconsin time when a glacial advance from the west displaced the river eastward from central Iowa to its present position. Researchers investigating stream valleys of the Driftless Area in southwestern Wisconsin suggest deep valley incision by streams also occurred during the early Pleistocene.

Wisconsin Glaciation (35,000-10,000 B.P.) • The early Pleistocene history of the Mississippi River above St. Paul has been obscured by late Wisconsin glacial events. The course of the river north of St. Paul changed repeatedly during the Pleistocene. Presumably each major glacial phase was followed by the establishment of a new course for the river, most of which joined the present course south of St. Paul. Previously formed bedrock valleys were subsequently filled with glacial sediment derived from the Superior Lobe and Grantsburg Sublobe. The numerous lakes dotting the landscape within the Twin Cities area resulted from meltout of glacial ice blocks buried in the bedrock valleys (Figure 4).

During the late Wisconsin maximum, the Superior Lobe advanced down the axis of the Lake Superior basin southwestward to its terminal position near Minneapolis and St. Paul, while the Wadena and Rainy Lobes and Brainerd Sublobe advanced across north central Minnesota (Figure 5a). This advance, known as the St. Croix phase of the Superior Lobe, culminated approximately 15,500 years B.P. Little is known about the nature of the advance; however, a detailed record of ice recession has been documented. The prominent St. Croix Moraine, a massive accumulation of glacial sediment extending from the Twin Cities northwestward to Little Falls, marks the terminus of the lobe. It is unclear where the position of the Mississippi River was at this time. The Mississippi River presently occupies a prominent gap eroded through the St. Croix Moraine. Most likely the river maintained its current position below St. Paul by continued flow underneath the advancing ice margin. Glacial outwash graded to terrace deposits along the Mississippi River in southern Washington County lends support to this hypothesis.

The St. Croix Moraine forms a northeastward trending, rugged belt of landforms containing numerous hills and

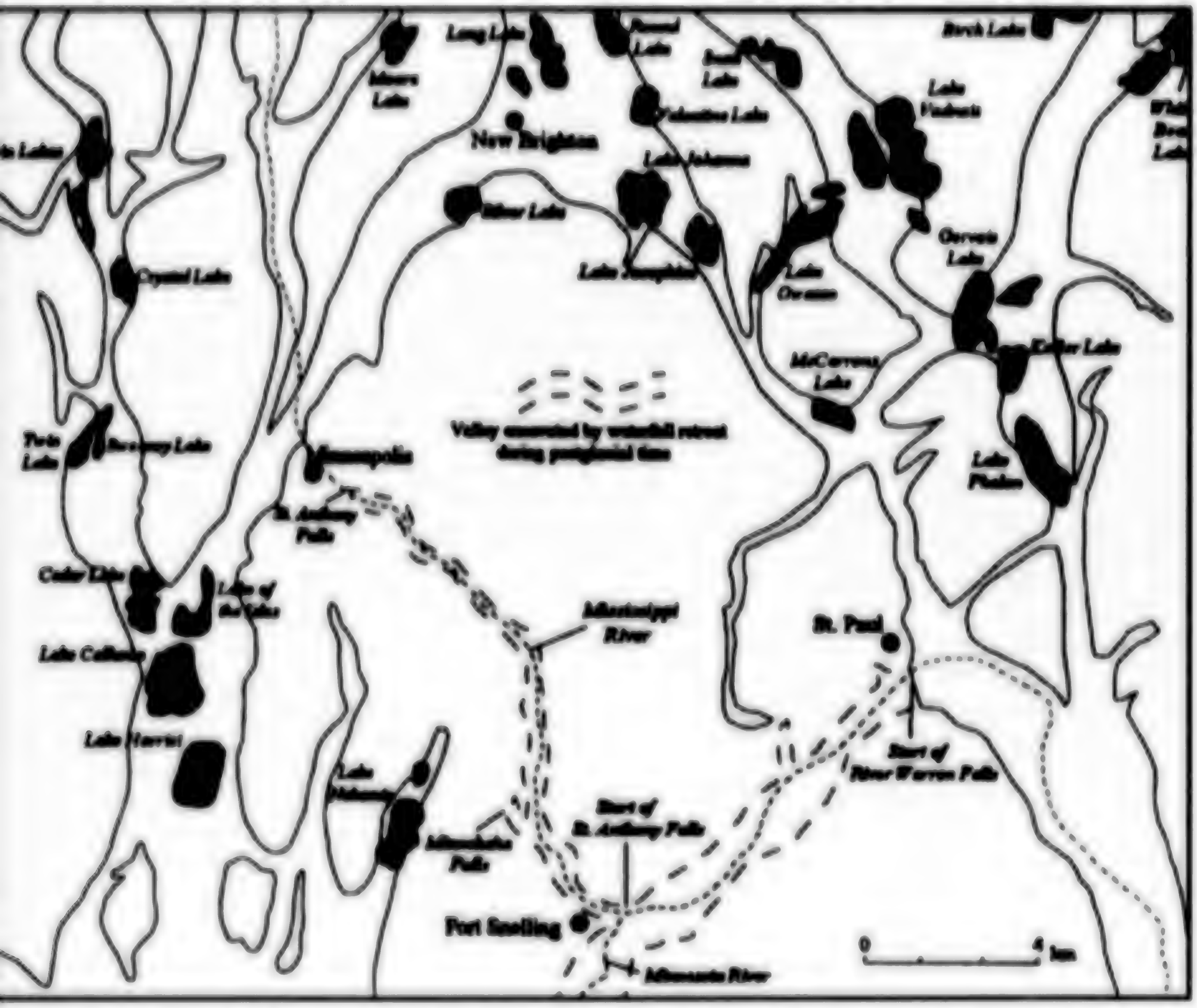
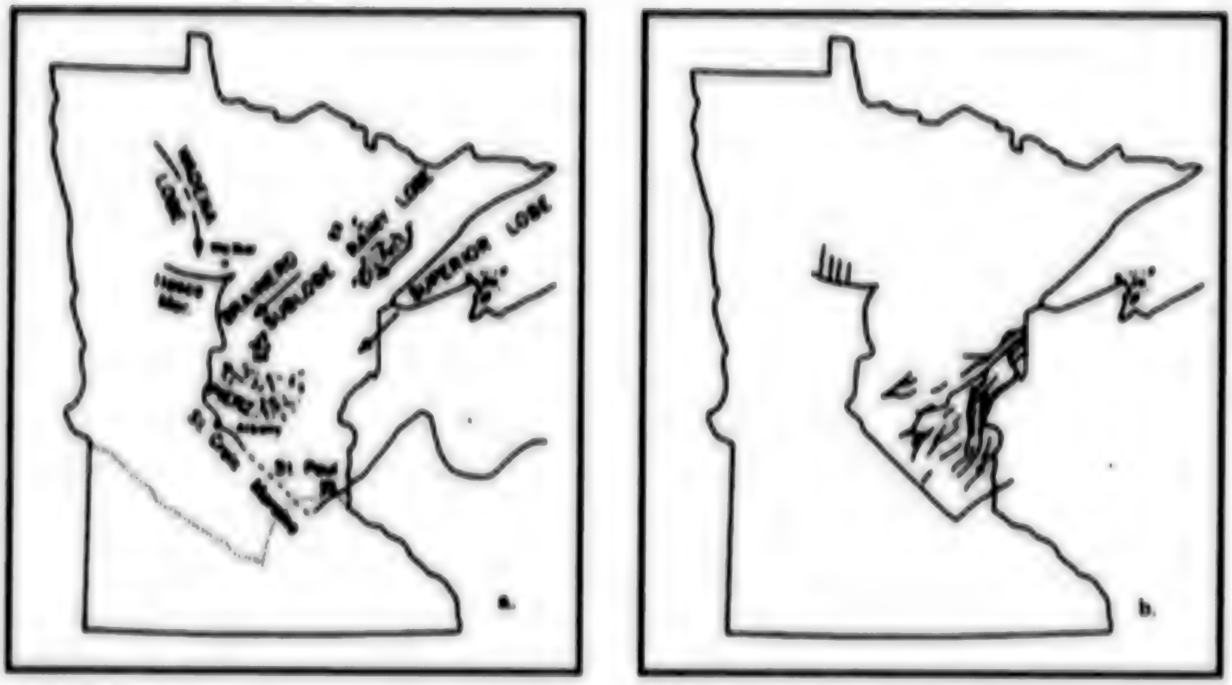


FIGURE [illegible]. Map of preglacial bedrock valleys (solid lines) in the Twin Cities area, showing the location of present day lakes developed by meltout of buried glacial ice. Discharge of glacial meltwater and waterfall retreat are responsible for development of present valleys (dashed lines).

associated depressions. Glacial sediment deposited during this advance consists of reddish brown sandy till, outwash sand and gravel, and ice contact sands and gravel.

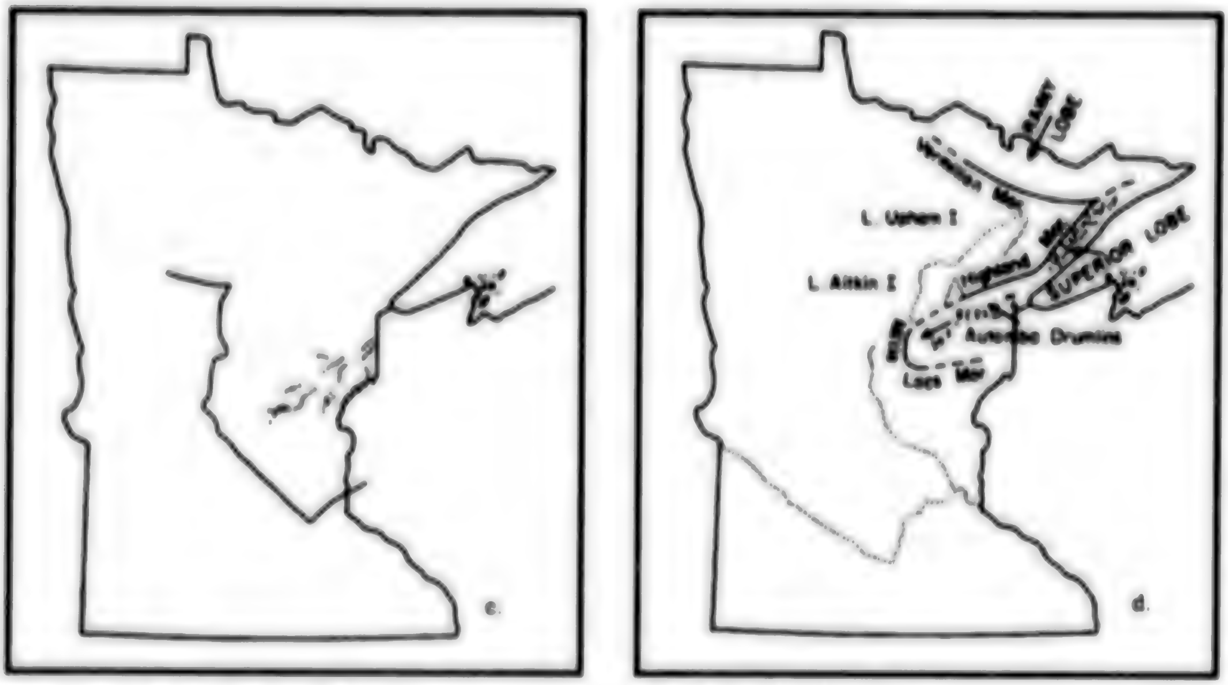
As the Superior Lobe retreated from the area, the Mississippi and St. Croix Rivers acted as the major course for the glacial meltwater. Outwash deposits filled both valleys between an elevation of 870 and 920 feet. Meltwater streams subsequently excavated the outwash deposits during a later glacial advance.

Numerous readvances, possibly surges, accompanied the retreat of the Superior Lobe from the St. Croix Moraine. Numerous features associated with the retreating ice, including moraines and associated meltwater channels, developed behind the moraine (Figure 5b). The Mississippi River, in the central portion of the state, flowed



a) the St. Croix phase

b) development of tunnel valleys



c) deposition of eskers in tunnel valleys

d) the Automba phase

FIGURE 5. Phases of glaciation in Minnesota. Taken from Wright.

along the western margin of the St. Croix Moraine, being fed by tunnel valleys (discrete meltwater channels) developed underneath the retreating ice lobe. Retreat of ice farther into the Lake Superior basin resulted in deposition of long, sinuous ridges of sand and gravel (eskers) within the tunnel valleys *(Figure 5c)*.

The next major advance of the Superior Lobe, the Automba phase, is marked by advance of the Superior Lobe into the Mille Lacs region of east central Minnesota *(Figure 5d)*. The extent of this advance is marked by the Mille Lacs Moraine, which bounds the western edge of Mille Lacs Lake in southeastern Crow Wing County, extending to the northeast as the Wright and Cromwell Moraines and then as the Highland Moraine along the north shore of Lake Superior. The Automba phase is correlated with the Tiger Cat advance in Wisconsin.[20] During the Tiger Cat advance, meltwater from the Superior Lobe discharged through the St. Croix River into the Mississippi River valley.

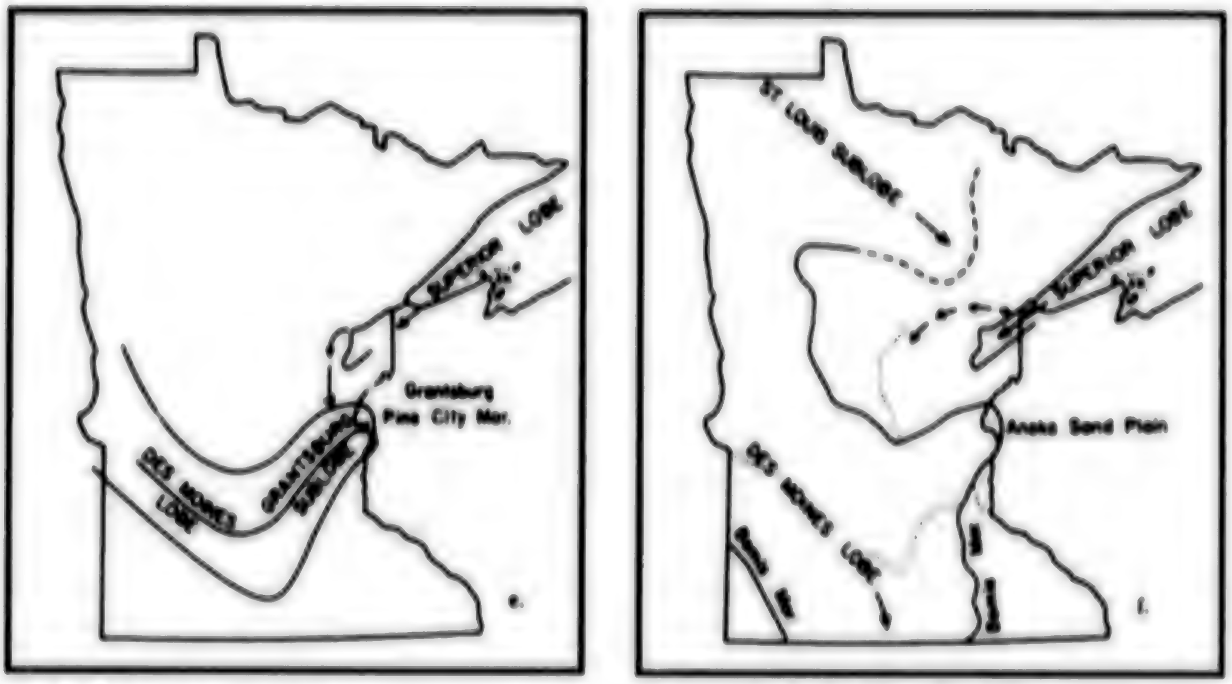
While the Superior Lobe stood at the Mille Lacs Moraine, meltwater ponded along the northwestern margin of the ice lobe, resulting in the formation of glacial lakes Aitkin I and Upham I, which presumably drained along the western end of the ice margin. The advance of the St. Louis Sublobe across the area erased any shoreline features that developed along these lakes. However, evidence for these lakes is preserved in a thin, red and gray, stone poor till deposited by the St. Louis Sublobe after overriding the lake plain. Any evidence for the location of the Mississippi River channel in the area was destroyed by subsequent ice movements; however, it is most likely that meltwater was still channeled along the outer margin of the St. Croix Moraine down to the Mississippi valley below St. Paul.

The Superior Lobe retreated from the Automba ice margin into the Superior lowland, initiating the first stage of glacial lake formation in the Superior basin. Glacial lake sediments were deposited in a large body of open water, which formed between the retreating Superior Lobe and higher topography to the southwest. Fine grained silt and clay settled out of the melting ice mass, forming a continuous blanket of sediment on the lake floor. The next advance of the Superior Lobe overrode the lakebed during the Split Rock phase, depositing a thin layer of reddish clay across previously formed deposits. The Split Rock Pine City phase marks the readvance of the Superior Lobe to the Cloquet Moraine and the overriding of the central portion of the St. Croix Moraine by the Des Moines Lobe *(Figure 5e, 5f)*.

Retreat of the Superior Lobe was followed by advance of the Des Moines Lobe from the northwest during the Pine City phase, which reached its maximum extent in central Iowa about 14,000 years B.P. An end moraine near the city of Des Moines marks the terminal position of the ice lobe. During this advance, outwash channels were cut through portions of the St. Croix Moraine, forming sand and gravel deposits that reached the Mississippi River near Hastings.

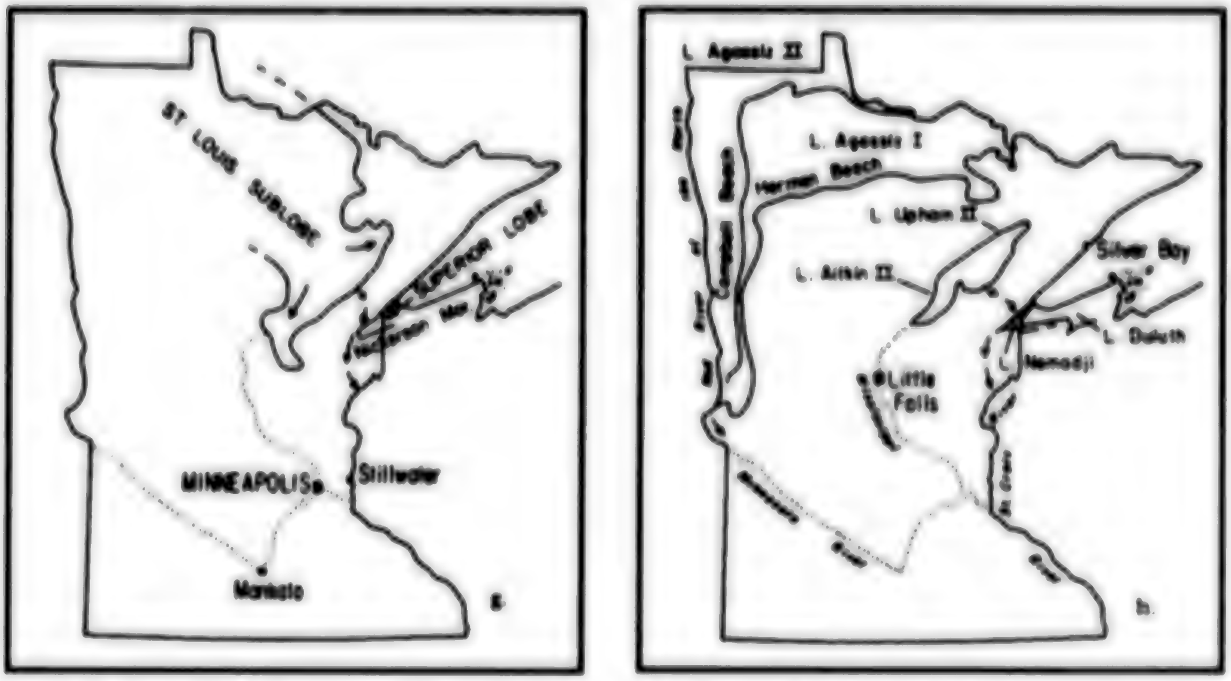
The Grantsburg Sublobe, an offshoot of ice developed from the Des Moines Lobe, advanced from the southwest overriding the St. Croix Moraine between St. Cloud and St. Paul, reaching its terminus near Grantsburg, Wisconsin, by about 13,500 years B.P. *(Figure 6)*. This short lived advance was responsible for altering the geologic development of the Mississippi River valley in two important ways. First, outwash coming off the advancing lobe filled the Mississippi River valley with sand and gravel. The deposits would later be entrenched by glacial meltwater forming a series of flat lying terraces between elevations of 800 and 820 feet along the valley. Second, advance of the lobe blocked the southward drainage of the Mississippi, resulting in the formation of glacial Lake Grantsburg.

While the Grantsburg Sublobe occupied east central Minnesota and west central Wisconsin, meltwater draining south flowed into glacial Lake Grantsburg. A large delta was formed near Spooner, Wisconsin, as sediment laden meltwater entered the head of the lake. The lake drained down the St. Croix River, eventually reaching the Mississippi River valley at Prescott, Wisconsin. As the Grantsburg Sublobe retreated to the southwest, meltwater drained around the outer (northeast) margin of the ice lobe, reworking the former lake bed and forming the Anoka Sand



e) Split Rock Pine City phase

f.) formation of the Anoka Sand Plain



g.) Nickerson Alborn phase

h.) drainage of glacial Lake Duluth

FIGURE 5 Phases of glaciation in Minnesota continued Taken from Wright

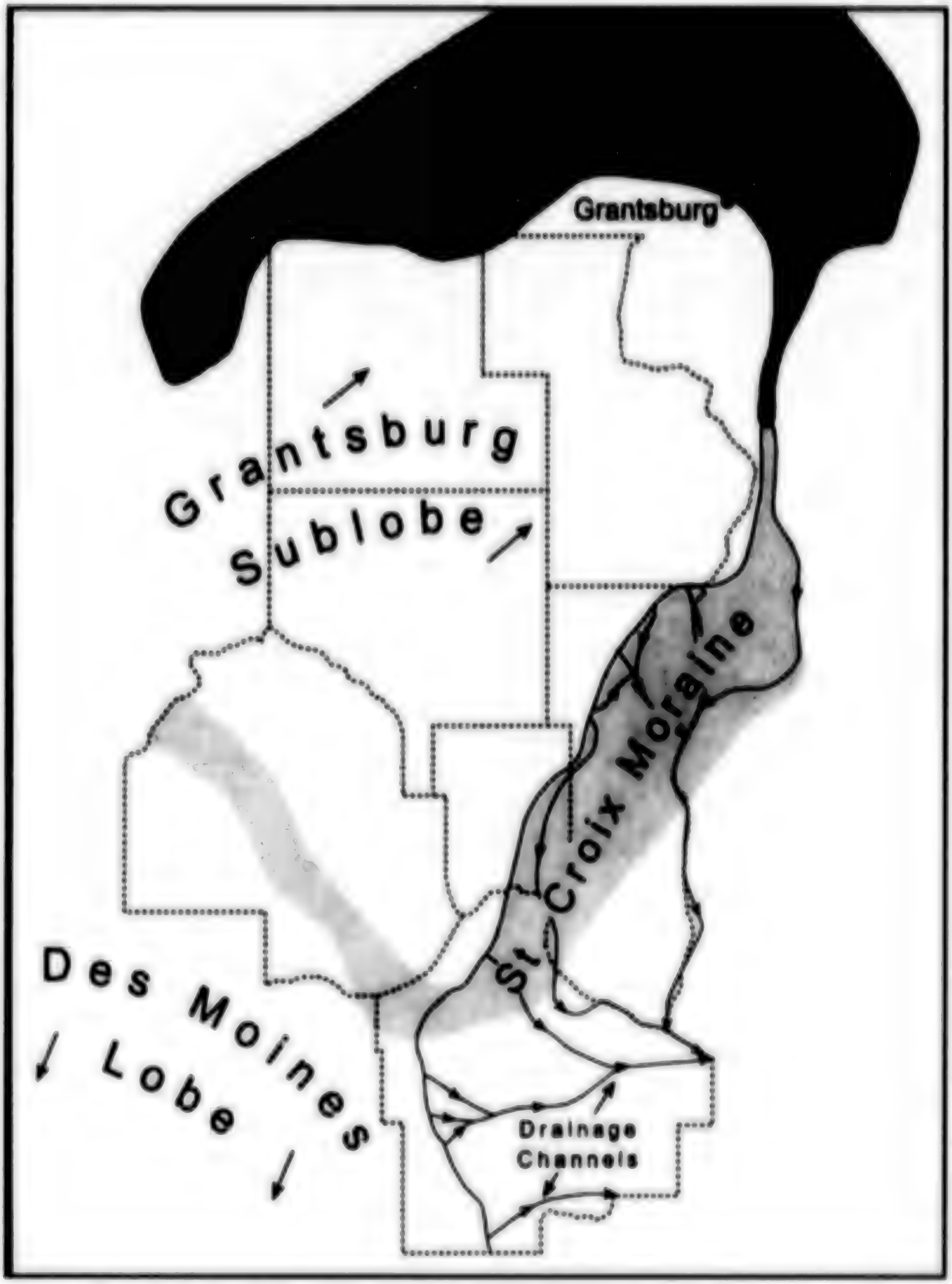


FIGURE 6. Advance of the Grantsburg Sublobe, an offshoot of the Des Moines Lobe, overriding the St. Croix Moraine blocking southward drainage of the Mississippi River, and forming glacial Lake Grantsburg. Drainage channels show paths taken by meltwater coming off the Grantsburg and Des Moines ice lobes. Redrawn from Meyer et al.

Plain in east central Minnesota (*Figure 5f*).

Farther south, retreat of the Des Moines Lobe was punctuated by a number of readvances, forming a series of discontinuous moraines in northern Iowa and southern Minnesota. By 12,300 years B.P., the Grantsburg Sublobe retreated back into Minnesota to join the Des Moines Lobe, which was retreating up the Minnesota River valley. A large braided meltwater stream developed along the retreating Grantsburg ice margin, forming a continuous blanket of sand and gravel along the present course of the Mississippi River above its confluence with the Minnesota River. As ice retreated further, the level of the Mississippi and Minnesota Rivers was established at an elevation of about 810 feet in the Twin Cities metropolitan area.

The last major glacial advance in Minnesota occurred during the Nickerson Alborn phase when the St. Louis Sublobe, an eastward extension of the Des Moines Lobe, invaded north central Minnesota, forming the Culver Moraine. Retreat of the St. Louis Sublobe allowed glacial lakes Aitkin and Upham II to develop, ponded between the ice margin and the Culver moraine.

Lake Aitkin II most likely drained into Lake Upham II, which eventually drained down the St. Louis and Mississippi Rivers. At the same time, the Superior Lobe readvanced to the Nickerson Thomson Moraines in north eastern Minnesota (*Figure 5g, 5h*). The Nickerson Moraine is marked by a belt of hummocky topography along the Carlton Pine County line between Moose Lake and Holyoke. A broad outwash plain extends off the Nickerson Moraine southward where it coalesces into a fairly well defined channel along the Kettle River. The Kettle channel drained meltwater into the St. Croix River and then down to the Mississippi.

By 12,000 years B.P., all ice lobes that had previously covered the surface of Minnesota were in full retreat. The Des Moines Lobe was retreating rapidly northward up the Minnesota River valley. Ice then readvanced a short distance to form the Big Stone Moraine in west central Minnesota about 11,900 years B.P. After the ice retreated north of the divide that separates the Hudson Bay and Mississippi drainages, glacial Lake Agassiz came into existence. In northeastern Minnesota, the Superior Lobe retreated from the Nickerson ice margin into the Superior Lowland, initiating the formation of glacial Lake Duluth.

Drainage of sediment free meltwater from glacial Lakes Agassiz and Duluth resulted in multiple downcutting events within the Mississippi River valley. A number of geologists have been active in working the drainage relationships of these lakes and their impact upon the landscape. Below is a summary of these works and how the events associated with glacial lake drainage affected the morphology of the upper Mississippi system.

Meltwater from Lake Agassiz drained down the River Warren into the Mississippi River valley. River Warren was named after G. K. Warren, the first commander of the St Paul District, Corps of Engineers. Above St. Paul, the Mississippi River was flowing on top of the Platteville Limestone, which resisted the river's erosive force. Below St. Paul, the River Warren intercepted a preglacial bedrock valley of the Mississippi River that was filled with outwash up to the elevation of the Platteville Limestone. The discharge of River Warren was more than adequate to carry the sediment load supplied to it; therefore, the unconsolidated outwash sediment was rapidly eroded from the preglacial valley. Once the outwash was carried away, a waterfall formed where the River Warren plunged over the Platteville Limestone into the preglacial bedrock valley. The waterfall was named River Warren Falls in honor of the mighty river that was responsible for its formation.

Glacial ice, advancing again across the continental divide, caused a build up of sediment within the River Warren, the St. Croix, and presumably, the Mississippi valleys approximately 11,700 years B.P. Glacial Lakes Agassiz and Superior reformed after 11,500 years B.P as the ice again retreated beyond the continental drainage divide. Discharge of meltwater out of the lakes established a fairly active period of downcutting that lasted until approximately 10,800 years B.P.

One final advance of ice blocked eastern outlets and caused renewed downcutting within the Mississippi valley between 9,900 and 9,500 years B.P. This final episode is the last time that meltwater from glacial lakes flowed down the upper Mississippi River system north of Illinois. These events played a vital role in the Holocene evolution of the Mississippi valley.

Early Holocene (9,500-7,000 years B.P.) • The decrease in discharge through the Mississippi River following the drainage of glacial lakes and subsequent rerouting of meltwater through northern and eastern outlets initiated a stage of alluviation within the valley. The River Warren Falls began retreating up the Mississippi valley, as water eroded the soft St. Peter Sandstone that underlay limestone caprock *(Figure 4)*. Below St. Paul the valley had been cut far below its present day level, possibly up to 50 meters (about 163 feet) deep.[17] In response to the change in base level, tributary streams initially cut their channels to reach the level of the Mississippi. Sediments stored in tributary valleys were soon transported into the Mississippi River, resulting in a fairly active period of alluviation. More sediment entered the Mississippi from its tributaries than the big river could carry away. As a result, a number of tributaries built fan deltas into the Mississippi River, deflecting its course and altering the physiography of the floodplain.

A good example of a tributary delta occurs at the confluence of the Mississippi River with the Chippewa River in Pepin County, Wisconsin. The formation of the delta effectively dams the Mississippi River, forming Lake Pepin. Zumberge proposed that Lake Pepin once extended upstream to St. Paul, based on the existence of clay deposits found in borings taken during the construction of the Robert Street Bridge in St. Paul.[18] Sediment entering the river above Lake Pepin has built a delta within the Mississippi that is slowly moving downstream. This delta begins at Hastings and extends to the head of Lake Pepin, south of Red Wing.

Equilibrium between the Mississippi River and its tributaries began to establish itself by 8,000 years B.P. By this time, the River Warren Falls had reached the Minnesota River valley, where it split into two parts. The River Warren Falls continued to retreat up the Minnesota River valley an additional two miles, where it intersected a buried valley of the preglacial Mississippi died out. St. Anthony Falls developed at the confluence of the Minnesota River near Fort Snelling and retreated up the valley of the Mississippi *(Figure 4)*.

Middle Holocene (7,000-3,500 years B.P.) • Slow alluviation along the Mississippi River continued into the middle Holocene. Vegetation was well established on upland areas by this time. Therefore, the change in upper midwestern rivers was most likely related to climatic effects on river discharge rather than changes in vegetation.[19]

Geomorphic processes acting in the valley were variable along the entire stretch of the upper Mississippi River. The upper reaches were characterized by vertical accretion (built up) of sediment, while lateral channel migration and incision into previously deposited sediment were occurring in downstream reaches.

As the middle Holocene progressed, climatic changes would again alter the processes acting within the valley. Cooler temperatures and increased precipitation began to dominate the regional climate, which may have initially increased runoff. In response, active lateral channel migration and incision dominated fluvial processes acting in the valley.

Late Holocene (3,500 years B.P. - A.D. 1850) • Much of the present day surface morphology of the Mississippi River floodplain is the result of fluvial activity occurring during the late Holocene. However, fluvial processes varied with location along the valley. Vertical accretion dominated various portions of the valley, while lateral channel migration, or cut and fill sequences, dominated other parts. As a result, the appearance of floodplain features within the valley varies, depending on location.

During the late Holocene, climate was still a major driving force for geomorphic processes. The regional cli mate continued its trend toward cooler temperatures and increased precipitation. By this time, vegetation and soils were most likely well developed on landforms not subject to inundation by floodwaters. Lateral channel migration, or cut and fill cycles, dominated these portions of the valley.

Geomorphic studies conducted in various portions of the upper Mississippi River valley indicate that the present-day position of the river channel changed little during the late Holocene.[illegible] This realization is important for several reasons. First, active fluvial processes would be confined to a limited channel area. As a result, the potential for erosion of landforms would be greatest near the active channel margin. Second, landforms within the floodplain away from the main channel would be subject to vertical accretion of sediment and preservation of natural features. This has implications for both the environmental and cultural resource records. Third, landforms that are topographically higher along the valley margin would have been less prone to flooding and the burial of previously developed surfaces.

It is difficult to assess the major changes that occurred within the floodplain of the upper Mississippi River valley during the late Holocene, without absolute chronological dates. Many of the changes occurring within the area were related to shifts in regional climatic patterns, which had a direct influence on geomorphic processes. Vertical accretion of sediment and forward movement of alluvial fans deltas dominated portions of the valley near the confluence of tributary streams. Areas away from tributaries were most likely subjected to lateral channel migration, resulting in reworking of previously deposited sediment. Erosional processes would have been dominant near the active channel, while constructional processes would have been active in backwater areas on the floodplain.

A.D. 1850 - Present • Land clearing efforts for the development of agriculture began during the mid 1800s within and adjacent to the MNRRA corridor. Erosion of topsoil from exposed fields increased the influx of sediment into the Mississippi River, especially in areas near the confluence of major tributary streams. Review of Mississippi River Commission maps provides evidence of the changes that have occurred.[illegible] Accumulations of up to two meters of post-settlement alluvium may occur on the floodplain in the southern reaches of the MNRRA corridor.

With the increased awareness of soil erosion along the land areas adjacent to the upper Mississippi valley and the development of modern agricultural equipment, farmers began to use improved farming techniques. By the 1930s farmers increasingly practiced contour plowing, conservation tillage, and no till planting. Some farmers left their fields fallow to increase the soil's nutrient capacity. These efforts greatly reduced topsoil erosion, decreasing sediment loads entering the Mississippi River.

Humans have changed the landscape of the valley and the flow of the Mississippi River in other ways, some as profoundly as the glaciers. Overall, however, humans have adapted to and developed around the river's geologic foundation. This will become clear in each subsequent chapter.

Prominent Natural Features

The Mississippi River valley is a significant natural feature in its own right. However, a number of individual features found along the river valley through the MNRRA corridor are notable. A brief description of each locality is presented below.

Glacial Terraces • Three prominent terraces occur along the course of the Mississippi River in the MNRRA corridor. Each formed as a result of late glacial meltwater drainage along the major rivers in the MNRRA corridor. The Richfield Terrace is the highest terrace surface, ranging in elevation from 890 feet above mean sea level (amsl) in the northwest corner of the MNRRA corridor to 840 feet amsl in the southeast corner. The city of Minneapolis is built largely upon this terrace surface.

Inset below the Richfield Terrace is the Langdon Terrace, which has the widest range of distribution throughout the corridor. Elevation of the Langdon Terrace ranges from 850 amsl in the northwest corner of the MNRRA corri dor to 800 feet amsl in the southeast corner. The Langdon Terrace exhibits a tremendous amount of variability in its sedimentary characteristics along the valley. Between St. Anthony Falls and Daytons Bluff the terrace developed on top of the underlying Platteville Limestone. Terrace sediments are only a few feet to tens of feet thick. Throughout the rest of the area, where preglacial erosion removed much of the bedrock, the terrace consists of 100 feet or more of sand and gravel. The cities of South St. Paul and Cottage Grove are built largely upon this terrace surface.

The Grey Cloud Terrace is the lowest terrace present along the Mississippi River in the MNRRA corridor. The Grey Cloud Terrace occurs only south of St. Paul and ranges in elevation from 750 to 700 feet amsl. Like the Langdon Terrace, it formed partially over bedrock. At Newport, the terrace consists of sediments a few feet thick on top of the Prairie du Chien Group. However, at Grey Cloud Island the terrace consists of a thick sequence of sand and gravel left as an erosional remnant of the once higher Langdon Terrace surface.

St. Anthony Falls • The Mississippi River cascading over the Platteville Limestone at St. Anthony Falls exemplifies the power of fluvial processes operating upon the land surface. Long revered for its natural beauty, the waterfall was once located at the confluence of the Mississippi and Minnesota Rivers but migrated upstream to its present location. The natural state of the falls has been modified by the construction of milling and hydroelectric power structures and a lock and dam system.

Shadow Falls • At Shadow Falls, a small tributary valley on the east bank of the Mississippi, in St. Paul, is one of the best exposed and easily accessible outcrops of the St. Peter Sandstone, Glenwood Shale, Platteville Limestone, and Decorah Shale in the Twin Cities. A variety of invertebrate fossils, including conodonts and trilobites, can be collected here.

Minnehaha Falls • Formed in a manner similar to St. Anthony Falls, Minnehaha Falls offers the observer an opportunity to view a waterfall in its natural state. The location of the falls within Minnehaha Park provides ready access to explore the bedrock geology of the Twin Cities in a small tributary to the Mississippi River.

Mississippi-Minnesota Rivers Confluence • Bdote, or confluence, as the Mdewakanton Dakota call it, is where the Mississippi and Minnesota rivers converge. Created by the discharge of meltwater from glacial Lake Agassiz down glacial River Warren, the confluence has been a gathering place for people throughout several millennia. Pike Island separates the two rivers where the valleys join, and the physical confluence is one mile downstream. Steep bedrock bluffs covered with a variable thickness of glacial sediment characterize the valley here. The confluence offers the opportunity to explore the natural riches contained in two very different river valleys.

Twin City Clay Pit/Lilydale Regional Park • Exposures of the Platteville Limestone, Decorah Shale, and lower Cummingsville Formation offer excellent fossil hunting at the Twin City Clay Pit/Lilydale Regional Park. In addition to bedrock geology, exposures of glacial till deposited by both the Superior and Des Moines Lobes can be found upon diligent search. The Decorah Shale was formerly mined at this location for clay used in the manufacture of bricks.

Daytons Bluff/Mounds Park • The St. Peter Sandstone, Glenwood Shale, and Platteville Limestone are exposed along Warner Road in Daytons Bluff. Overlying the bedrock is a thin cover of glacial sediment deposited by the Superior Lobe during late Wisconsin glaciation. At the base of the bluffs is an apron of colluvium derived from sediment weathering and eroding of bedrock. Six mounds, built by Native American inhabitants some 2,000 years ago, lie on top of the bluff. This location offers an excellent example of combined natural and cultural resources.

Battle Creek Park • The uppermost 50 feet of the St. Peter Sandstone is exposed within the valley of Battle Creek Park.

It is one of the best examples of a preglacial valley developed in bedrock that escaped being filled with glacial sediments in late-Wisconsin time.

Pigs Eye Lake • Pigs Eye Lake was a naturally occurring open body of water within the floodplain of the Mississippi. At one time it may have been part of Lake Pepin, which is believed to have extended to St. Paul during the early Holocene. The lake now serves as a haven for a variety of wildlife, including birds, fox, beaver, raccoon, and similar floodplain dwellers.

Lower Grey Cloud Island • A terrace remnant related to late glacial trenching of the Mississippi River, Lower Grey Cloud Island is composed of stratified sand and gravel deposits overlain by fine sand. The island has many mound groups constructed by the river valley's early inhabitants.

FIGURE 1. As the glaciers retreated some 12,000 years ago, Native Americans began inhabiting the northern Mississippi River Valley. Indians Spearing Fish 3 Miles below Fort Snelling. Artist: Seth Eastman. Minnesota Historical Society.

Chapter 2

Early Native American Life in the MNRRA Corridor

Drew M. Forsberg, M.S. • Hemisphere Field Services, Inc.

By archaeological accounts, Native American history in Minnesota spans some 12,000 years *(Figure 1)*. During this time, the Mississippi River and its valley became important to Native American peoples, providing plant and animal resources, shelter, and an important route for transportation and trade. This chapter examines Native American history in the MNRRA corridor beginning with the earliest occupants and ending with the coming of European explorers and traders.

Written records help document Native American history over the last 350 years. European and American explorers and fur traders left accounts that provide details about Native American history and lifeways. Archaeological excavations of villages, trading posts, forts, and human burials add to this written record. However, written records extend back only as far as the mid-1600s. The long history of Native Americans that predates contact with Europeans and Americans must be reconstructed from archaeological information and, when possible, from oral histories preserved by modern Native American peoples. Because archaeological data pertaining directly to the MNRRA corridor is limited, it is necessary to look at a broader region of Minnesota when discussing pre-contact Native American history. Archaeological information for the earliest periods is sparse, making it necessary to draw inferences from far afield.[1]

Early Native American Contexts within the MNRRA Corridor

Paleoindian Tradition • Humans probably began occupying the MNRRA corridor as the last glaciers retreated. As the ice sheet of the Des Moines Lobe melted, a new landscape emerged and communities of plants, animals, and humans colonized it. Initially, tundra vegetation covered this landscape, but as the climate warmed, a boreal forest dominated by spruce moved north to replace the tundra ecosystems. Humans most likely followed the spread of plants and animals northward.[2]

Archaeologists generally refer to the earliest Americans as Paleoindians. In other parts of North America, where archaeologists have excavated early sites, they have identified patterns in lifeways and material culture over time and space. However, because few Paleoindian sites have been identified in Minnesota and even fewer have been excavated, our knowledge of this period is limited. The Paleoindian tradition is usually divided into two periods: Early (12,000-10,000 years before present [B.P.]) and Late (10,000-8,000 years B.P.).[3]

Early Paleoindian (12,000-10,000 years B.P.) • The Early Paleoindian period is poorly known in Minnesota. No intact sites from this period have been identified. Some projectile points (Clovis and Folsom), resembling types found elsewhere in North America, are the only evidence that Early Paleoindian peoples occupied Minnesota. These points, however, were found on the surface and not well documented. Based on these finds, we can make some generalizations about Minnesota's Early Paleoindian people and their way of life. These people probably lived in small, highly mobile bands, hunting large, now-extinct animals, such as the mammoth, mastodont, or camel. Because there is little diversity in projectile point forms over large areas and because groups were so mobile, we assume that Early Paleoindian peoples had little sense of regional identity. The projectile points attributed to this period are distinctive in form, generally being lanceolate (leaf-shaped) and rather large. In addition, their makers removed long flakes (flutes) from each face of the projectile point near the base where they would have attached it to a wooden shaft. Paleoindians generally made their projectile points from high quality stone, which they sometimes procured from great distances.[1]

Fluted points have been found in or near the MNRRA corridor (one in Anoka County and seven in Hennepin County).[2]

However, amateur collectors found most of these artifacts on the surface of cultivated fields, and information on the exact location and circumstances of discovery is meager. One point reportedly comes from the MNRRA corridor *(Figure 2)*. In 1941 a collector discovered a Clovis-like fluted point "eroding from a high bank of the Mississippi River just south of the Washington Avenue Bridge" in Minneapolis.[3]

While these finds indicate that Native Americans used the MNRRA corridor during Early Paleoindian times, nothing is known of the extent of their occupation and little of their specific lifeways.

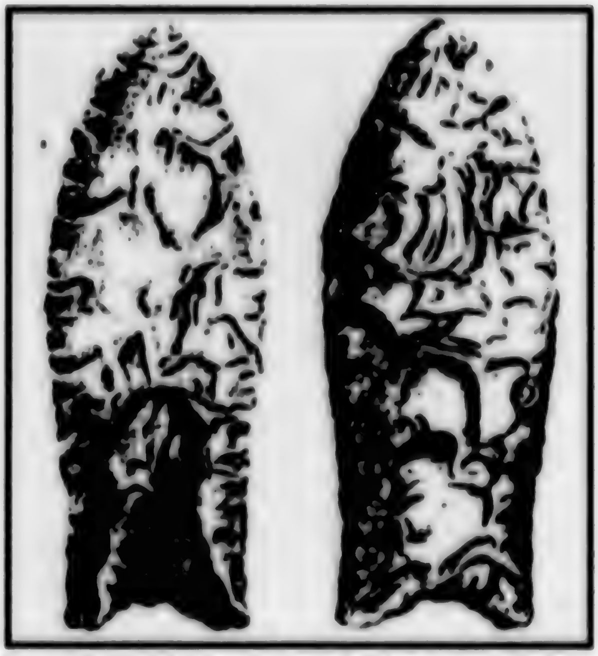


FIGURE 2. A Clovis-like projectile point found eroding from the river bluff in 1941 just south of the Washington Avenue Bridge. Reproduced from Steinbring (1974: Figure 1).

Late Paleoindian (10,000-8,000 years B.P.) • Cultural changes that coincided with climatic and subsequent environmental shifts mark the Late Paleoindian period. As the glaciers left, the climate warmed. By about 10,000 years B.P., forest vegetation covered much of Minnesota, except for the western part. In southeastern Minnesota, oak, maple, elm, and ash dominated the forest, whereas a pine forest covered central Minnesota. A trend toward a warmer and drier climate and the northeasterly expansion of prairie vegetation characterize the subsequent millennia. By about 8,000 years B.P., the prairie/forest border had advanced into east central Minnesota.

In general, lifeways during the Late Paleoindian period initially resembled those of the Early Paleoindian period. Late Paleoindian peoples moved frequently and depended upon hunting. However, as communities of plants and animals changed in response to the changing climate, so too did the humans that relied on them for subsistence. As the mammoth, camel and other megafauna that flourished during glacial and immediately postglacial times became extinct, the Late Paleoindian peoples increasingly turned to other quarry. In the prairie regions of North America, bison became the primary food, although Native Americans undoubtedly consumed smaller animals and various plants as well.

Recognition of the Late Paleoindian period is most often based on the presence of distinctive, finely crafted projectile points made from high quality stone. These points were lanceolate but lacked the pronounced fluting seen in Early Paleoindian specimens. Rather, their makers removed narrow flakes from both faces in parallel patterns. Late Paleoindian points display greater variation in form, and archaeologists have identified many distinct types, such as Alberta, Cody, Agate Basin, and Scottsbluff.

Late Paleoindian sites in Minnesota are rare, and few have been excavated. Only two have yielded radiocarbon dates: the Brown's Valley site (21TR5), located in Traverse County in western Minnesota, and the Bradbury Brook site, located south of Mille Lacs Lake in east central Minnesota. Human bone from the Brown's Valley site was radiocarbon dated to about 9,000 years B.P., whereas a piece of charcoal from a pit feature at the Bradbury Brook site was radiocarbon dated to about 9,700 years B.P.

A recent survey of literature and collections indicates that Late Paleoindian points have been found throughout Minnesota. Most are surface finds, often picked up by collectors, who recorded the locations imprecisely or not at all. Although a moderate number of points have been found in or near the MNRRA corridor, most came from uplands well away from the Mississippi River. However, archaeologist T. H. Lewis discovered several points in the late 1800s on the floodplain across from downtown St. Paul (*Figure 3*). He did not record the exact location(s) where he found these artifacts, and no State site number exists. Recently, archaeologists recovered a Late Paleoindian point during excavations at the Sibley House/American Fur Company site (21DK11) near Mendota, but they discovered no other Late Paleoindian materials. Native Americans clearly lived in the area during Late Paleoindian times, but until someone finds a well preserved site, nothing substantial can be said about the people of this period.

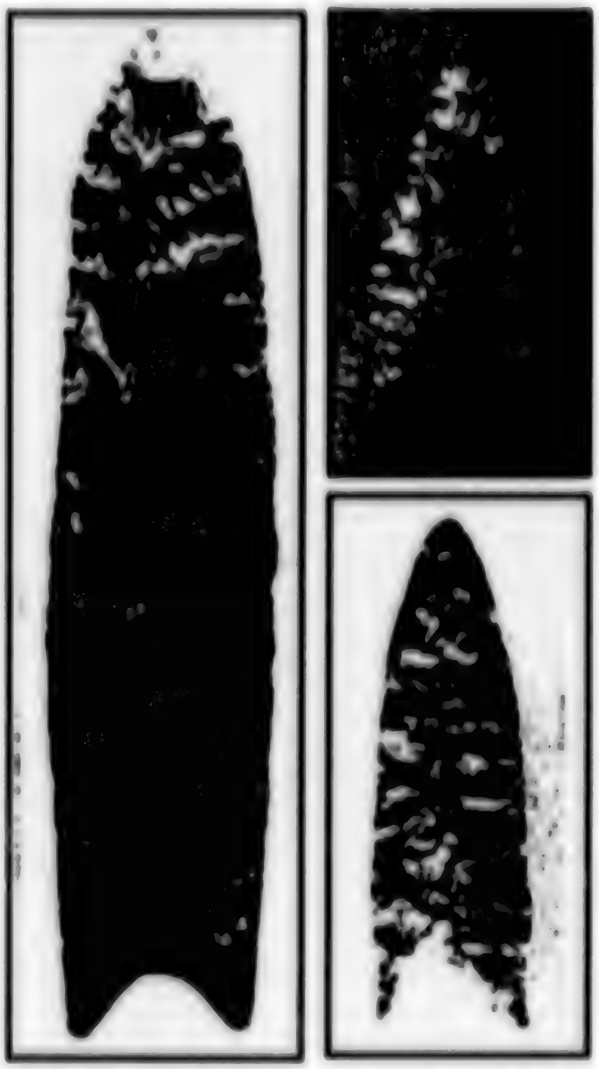


FIGURE 3. Three Late Paleoindian projectile points found by T. H. Lewis on the floodplain of the Mississippi River near downtown St. Paul. Reproduced from Florin (1996: Figure 1.19).

Archaic Tradition (8,000-2,500 years B.P.) • During Archaic times, Minnesota's occupants continued to adapt to ongoing changes in climate and vegetation. The trend toward a warmer and drier climate that began about 9,000 years B.P. continued, accompanied by the northeasterly expansion of prairie vegetation. By about 6,000 years B.P. prairie covered much of Minnesota, including the entire MNRRA corridor. Lake levels in the region fell, and substantial sand dunes spread in the Anoka Sand Plain region, located just east of the Mississippi River in Anoka County. After about 6,000 B.P., the climate gradually became wetter and cooler. In response, forests pushed the prairie to the southwest. The forest-prairie border reached its present location by about 3,000 years ago.[illegible]

In general, changes in subsistence and settlement patterns differentiate the Archaic tradition from the preceding Late Paleoindian period. Archaic peoples became somewhat more sedentary, as they learned to use more diverse plant and animal resources for subsistence, and their tool technology changed and diversified. They used grinding stones to process plant foods, and they made tools from metamorphic or igneous rocks for cutting and chopping wood. In addition, by about 7,000 years B.P., Archaic peoples began to develop a copper tool technology, using pieces of native copper mined from the Lake Superior region or found locally in glacial drift. They fashioned knives, projectile points, gouges, other tools, and decorative items from copper. In the past, archaeologists thought that copper artifacts from the Midwest represented part of an "Old Copper" industry dating to later Archaic times (ca. 5,000-3,000 years B.P.). However, archaeologists now recognize evidence that Native Americans used copper before and after this period. No copper artifacts have yet been recovered from sites located in the MNRRA corridor.

As with the Paleoindian tradition, the form and composition of stone projectile points provide information about Archaic lifeways. The narrower distribution and greater diversity of projectile point styles may indicate an increase in regionalism. Innovations in hafting technology (how Native Americans attached their points) are evident in the change from lanceolate points to points that were notched or stemmed at the base. Archaic points lack the finely executed, parallel flaking seen in Late Paleoindian specimens, and the craftsmanship declined or became less important. In addition, Archaic peoples relied more upon stone procured from local sources, which was often inferior to materials used during preceding periods.

In parts of the Midwest where greater numbers of Archaic sites have been identified and excavated, archaeologists divide the Archaic tradition chronologically into three periods: Early, Middle, Late. However, known Archaic sites are rare in Minnesota, and it has not yet been possible to assign this chronology to the region with any confidence. Moreover, because the environment influenced the lifeways and material culture of Archaic peoples, there are differences in the subsistence/settlement strategies and toolkits of inhabitants of the western prairie, the deciduous forests of the eastern woodlands, and the northern boreal forests of the Canadian shield.

Excavations of Archaic sites in western Minnesota at the Itasca Bison Kill site, in Itasca County, and the Canning site, in Norman County, indicate a subsistence pattern that focused on hunting bison but also exploited smaller animals and plant foods. Farther to the east, in areas that were continuously forested during Archaic times, a different adaptive pattern is evident. Here, subsistence focused on riverine resources (like fish and freshwater clams), nuts and deer. Because the environment of the MNRRA corridor changed dramatically during the Archaic (from forest to prairie, and back to forest again), it is likely that adaptive strategies changed as well.[illegible]

Few Archaic sites have been identified and excavated in eastern Minnesota. Those few sites that are known generally date to the later portions of the Archaic period. The Petaga Point site (21ML11), located just south of Mille Lacs Lake, contains an Archaic component.[illegible] While the artifacts recovered from this component resemble types seen at sites from the same period in the Great Lakes region and the upper Mississippi River valley, the site lacked good information on the lifeways of the site's Archaic inhabitants. The St. Croix River Access site (21WA49), on the St. Croix River in Washington County, just east of the MNRRA corridor, yielded evidence for two separate episodes of occupation during Archaic times.[illegible] The site's occupants manufactured tools from stone taken from nearby bedrock outcrops. Animal remains present at the site indicate that they consumed white-tailed deer and beaver.[illegible] The King Coulee site (21WB56), located at Lake Pepin, includes a Late Archaic component.[illegible] Archaeological evidence from the site indi cates that its inhabitants focused on riverine animals, although nuts and seeds were important. Most significantly, archaeologists obtained a radiocarbon date from a domesticated squash seed excavated from an Archaic horizon at the site, providing evidence for the earliest use of domesticated plants in the upper Mississippi River valley.

At present, it is unknown whether the lifeways practiced at the Archaic sites mentioned above extended into the MNRRA corridor. Although three sites within the MNRRA corridor are thought to have Archaic components, including the Lee Mill Cave (21DK2), Ranelius (21DK4), and Sibley House/American Fur Company (21DK31) sites, little information is available. The Archaic component at the Lee Mill Cave site consisted only of a fire pit that contained fish bones. No artifacts were associated with the fire pit, and its affiliation with the Archaic period was determined solely because it was located below a Woodland component. Further characterization of the Archaic occupation of the MNRRA corridor must await the identification and excavation of additional sites.

Woodland Tradition (2,500-150 years B.P.) • Several new technologies and activities characterize the Woodland tradition. The introduction of pottery and the construction of earthen mounds for burial of the dead are hallmarks of this period. Initially, few changes in lifeways accompanied the Archaic-Woodland transition, but a trend toward more sedentary settlement patterns and the intensification of horticulture characterizes this era. Within the MNRRA corridor, it is likely that Native American peoples continued to rely on riverine resources for their subsistence.

During the Woodland era, the climate continued moving toward current conditions. Prairie vegetation decreased while forest vegetation (pine and oak) increased, and the prairie-forest border reached its present location. Lake levels rose across the region in response to cooler and moister conditions. Although the climate was relatively stable over the long term, several short-term fluctuations occurred. Between about 1,000 and 500 years B.P., temperatures increased. This warmer period, known in other parts of the world as the Medieval Warm Period, corresponds to the emergence of maize horticulture and intensification of wild rice use among Minnesota's Native American peoples. At least two episodes of cooler and moister conditions occurred as well: one from 1,600 to 1,400 years B.P. and the other from A.D. 1550 to 1850. It is likely that the Little Ice Age affected Minnesota's Native Americans, especially those who relied upon horticulture. In any case, during the cooler and moister conditions of the Little Ice Age, the forested area expanded south from east-central Minnesota to create the so-called Big Woods.

Early Woodland (2,500-2,000 years B.P.) • The Early Woodland period is poorly known in Minnesota. Elsewhere in the Midwest, the period is marked by an increased focus on riverine resources and the use of domesticated plants. Early Woodland peoples first began to manufacture and use pottery, which initially was heavy and thick walled. In addition, they began to bury their dead in large conical earthen mounds, which often possessed internal structures or chambers built of rock or logs. Projectile points from this period are often straight stemmed.

In Minnesota, few Early Woodland sites have been identified, and most of these lack radiocarbon dates. The most famous Early Woodland site in the region is the La Moille Rockshelter (21WN1), located in the Mississippi River valley downstream from the MNRRA corridor. This site, probably a fishing camp, yielded a ceramic vessel that strongly resembles Early Woodland ceramics found in Ohio, Indiana, Illinois, Michigan, and Kentucky. The vessel is thick walled (10-15 mm) with a flat lip, and its exterior was cord roughened and decorated below the rim with rows of circular punctuations and fingernail impressions. The clay used to construct the vessel was tempered with crushed stone or grit. At the King Coulee site (21WB56), on Lake Pepin, archaeologists recovered similar thick-walled ceramics. As at the La Moille Rockshelter, fishing seemed to be the primary subsistence activity, although the remains of

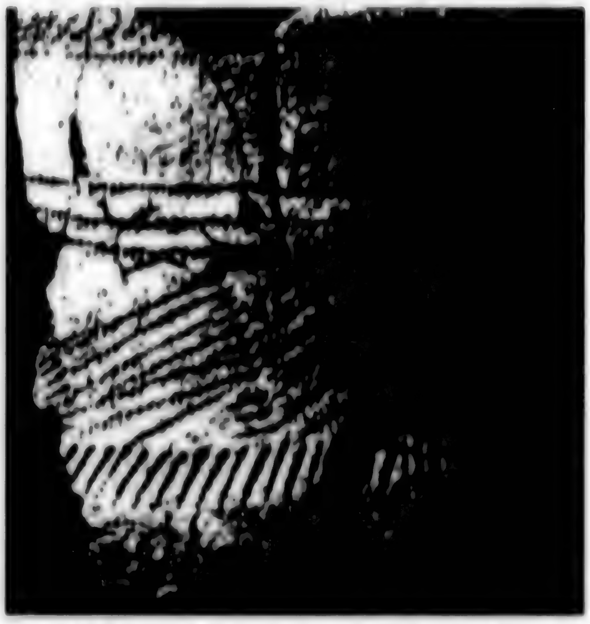


FIGURE 4. Part of an Early Woodland ceramic vessel excavated from the Schilling Archaeological District (21WA1) on Grey Cloud Island. Reproduced from Withrow et al. (1987: Figure 1).

other animals (mammals, birds, reptiles, and shellfish) were present. Moreover, King Coulee's Early Woodland inhabitants ate nuts and seeds.[20]

The Schilling site (21WA1), located on the eastern tip of Lower Grey Cloud Island, is the only known Early Woodland site recorded in the MNRRA corridor. Excavations at the site yielded thick walled ceramics (*Figure 4*) that are similar to those recovered from the La Moille Rockshelter and the King Coulee site. During the Early Woodland, the site was probably inhabited during the summer. Its inhabitants ate various mammals and birds. Interestingly, despite the site's setting and despite the apparent importance of fishing at other Early Woodland sites, fish remains are absent from the Schilling site.[21]

Middle Woodland (2,000-1,500 years B.P.) • During Middle Woodland times, complex cultures developed along the Ohio, Illinois, and Mississippi River valleys. These cultures are best known for the appearance of sophisticated mound and mortuary centers, long distance trade in exotic raw materials (copper, marine shell, and obsidian), increased population density, and the first use of corn as a cultigen in eastern North America. The major Middle Woodland centers were in Ohio and Illinois, although evidence of Middle Woodland influence occurs at many sites in the midcontinental region. Although archaeologists are debating how to interpret Middle Woodland culture, they agree that it represents a major florescence.

In Minnesota, the influence of eastern Middle Woodland groups is most apparent on the Anoka Sand Plain. The region contains the most northerly Middle Woodland center, which is represented by the Howard Lake phase. Numerous sites containing Middle Woodland materials related to the Havana Hopewell complex of Illinois have been identified. The large number of Middle Woodland sites in the Anoka Sand Plain indicate that it was an important population center, and several large conical burial mounds are present in the area. Howard Lake ceramics are quite similar to the Havana Hopewell materials of Illinois, and artifacts made of exotic raw materials, particularly copper, have been found in this area. The Howard Lake phase appears to parallel the rise and subsequent decline of the Middle Woodland culture farther south and east.

Evidence for a Middle Woodland presence has also been found south of the Anoka Sand Plain, along the Mississippi River. A number of sites in the MNRRA corridor show Hopewellian influences. Most dramatically, several large, conical burial mounds at the Indian Mounds Park (21RA10), in St. Paul, were excavated in the nineteenth century, revealing burials interred in log tombs and limestone cists. Grave goods included exotic items typical of Hopewell burials, such as platform pipes carved from stone, ornaments hammered from sheets of copper, and a clay death mask. Unfortunately, nearly all the artifacts excavated from this site have disappeared.

Hopewellian influences are also seen, albeit less dramatically, at several habitation sites a short distance downstream. These sites, exemplified by the Sorg site (21DK1), yielded ceramics stylistically similar to Havana Hopewell specimens *(Figure 5)*. The decorative traits of the Sorg ceramics are similar to those seen on Howard Lake ceramics; however, the chronological and cultural relationships between Howard Lake and Sorg are not understood. The presence downriver, in Trempealeau County in western Wisconsin, of other sites showing Havana Hopewell influence suggests that ideas and technology may have traveled from Illinois via the Mississippi River. With sites extending from the Anoka Sand Plain to Spring Lake, near Hastings, the Middle Woodland peoples clearly used the Mississippi through the MNRRA corridor.[illegible]

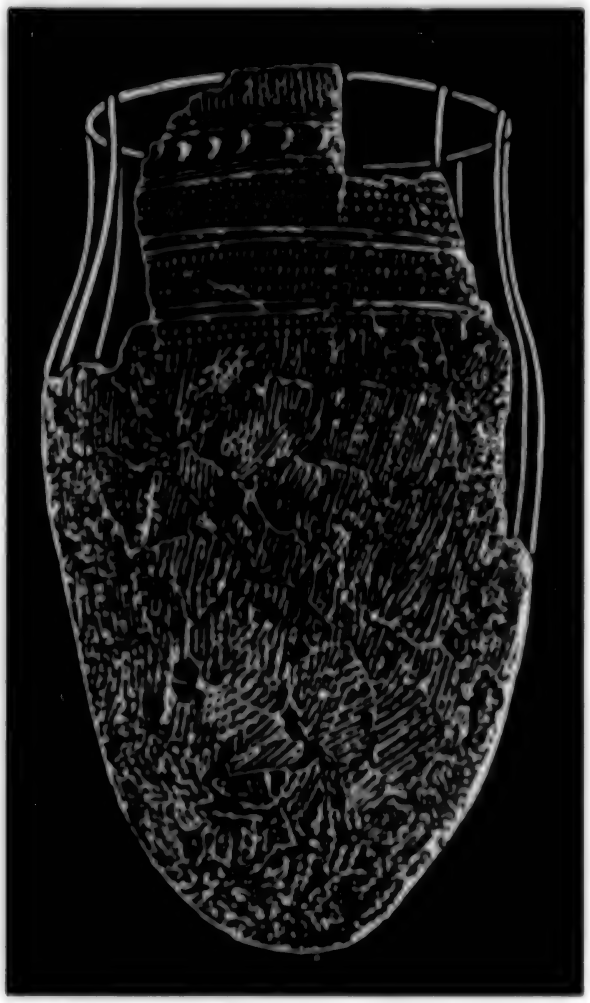


FIGURE 5. A reconstructed Middle Woodland vessel excavated from the Sorg site (21DK1) at Spring Lake. Reproduced from Johnson (1959: Plate 3).

Middle to Late Woodland Transition (1,600 1,100 years B.P.) • At the close of the Middle Woodland, following the decline of the Havana Hopewell influence, a transitional phase occurred. This transition was expressed somewhat differently in east-central and southeastern Minnesota. In each region, certain Middle Woodland traits persisted (ceramic styles and conical burial mounds), but distinct regional life ways developed.

EAST CENTRAL MINNESOTA • The hallmark of this transitional period in east central Minnesota is the growing importance of wild rice as a food staple. Projectile points became smaller and triangular, suggesting that Native Americans used the bow and arrow. This new, more effective weapon allowed Native Americans to concentrate on a few species of large animals, such as deer or bison. These developments suggest that Native Americans developed a more focused subsistence strategy, and perhaps as a result of these changes in subsistence, the Native American population increased across the region.[illegible]

In east central Minnesota, the St. Croix phase represents the Middle to Late Woodland transition. St. Croix habitation sites are typically located near lakes good for wild rice, fishing, and waterfowl hunting. Projectile points associated with the St. Croix phase are finely made isosceles triangular points or side notched points. Grit tempered vessels, with cord roughened surfaces, characterize St. Croix series pottery. Decorations consist of simple geometric designs made with a dentate stamp, a comb stamp, or a stick finely wrapped with cord.

The Onamia series is a second ceramic type associated with the Middle to Late Woodland transition and may post date St. Croix ceramics. Onamia ceramics are similar in form and surface treatment to St. Croix ceramics. However, the two types differ in decorative styles. Onamia ceramics are distinguished by loosely wound, widely spaced, cord wrapped stick impressions, whereas dentate and comb stamping are less common decorative traits.

No St. Croix Onamia sites are currently recorded for the

MNRRA corridor. The majority of sites with St. Croix and/or Onamia components are located in the lake region of east central Minnesota. However, sites with St. Croix and/or Onamia ceramics are often found near the MNRRA corridor, at lakes in the uplands of Anoka, Dakota, Hennepin, Ramsey, and Washington Counties. Moreover, sites occasionally lie within the St. Croix valley and elsewhere in the Mississippi valley. For example, the St. Croix Access site (21WA49) yielded St. Croix ceramics. Given the proximity of so many St. Croix/Onamia sites, it is possible that sites of that affiliation will be discovered along the MNRRA corridor.

SOUTHEASTERN MINNESOTA • During the Middle to Late Woodland transition, inhabitants of southeastern Minnesota continued to use riverine food resources, as in the preceding periods, but increased their use of domesticated plants. A horticultural economy, focused on squash, sumpweed, and starchy seeded plants (goosefoot and knotweed), began to emerge. Ceramic vessels became slightly thinner, although the use of grit temper and Havana Hopewell decorative traits (dentate stamping) continued. The La Crosse area has well known sites dating from this period. The previously mentioned King Coulee site at Lake Pepin contains a Middle Woodland/Late Woodland Transition component; however, it lacked detailed subsistence data. No one has discovered a site from this transitional period in the MNRRA corridor. Still, some potential exists that sites will be identified, particularly in the corridor's southern reaches.[illegible]

Late Woodland (1,350-300 years B.P.) • During the Late Woodland period, lifeways differed significantly in east central and southeastern Minnesota. Environmental differences between the two areas may account for much of this difference.

EAST CENTRAL MINNESOTA • In the "lakes district" of east central Minnesota, the Kathio/Clam River phase represents the early Late Woodland period. During this phase, the trend toward the more focused subsistence practices continued. Increasingly, Native Americans relied on the harvesting of wild rice and the hunting of deer and other small mammals. An increase in the size and number of sites indicates that their population was rising. In general, these sites lie near shallow lakes or streams where wild rice would have been plentiful. Projectile points from this period are small, triangular points that are sometimes notched, reflecting the continued use of the bow and arrow. The Kathio and Clam River pottery, which are closely related, are similar to the preceding St. Croix and Onamia ceramics in terms of temper, surface treatment, and decorative traits. However, these Late Woodland vessels are more globular, and their walls are somewhat thinner. These trends indicate a gradual evolution of ceramic manufacturing techniques and decorative styles.[illegible]

No sites with Kathio/Clam River components are recorded in the MNRRA corridor. Kathio and Clam River sites are more frequent north of the MNRRA corridor but do appear in the uplands of Anoka, Hennepin, and Washington Counties away from the Mississippi River valley. As with the preceding St. Croix/Onamia phase, there is some potential for the existence of sites with Kathio/Clam River components in the MNRRA corridor, particularly in its northern reaches.

Around 1,000 years B.P., a new pottery type, called Sandy Lake, suddenly replaced the Kathio/Clam River ceramic series across central Minnesota. Sandy Lake ceramics are thin walled, have cord roughened or smooth surfaces, and are tempered with grit or crushed shell. Decoration is rare. When present, it usually consists of simple notching around the rim. Lifeways in the Sandy Lake phase resembled those of the preceding Kathio/Clam River phase, although Native Americans developed techniques for roasting and storing wild rice during this period. Archaeologists interpret the sudden advent of Sandy Lake ceramics as evidence of the arrival of a new people, perhaps the Eastern Dakota, who displaced the earlier Woodland population. Sandy Lake sites are concentrated in central Minnesota, but the ceramics are found occasionally at sites to the south. For example, a few shards of Sandy Lake pottery were recovered from Late Woodland levels at the St. Croix Access site (21WA49). Interestingly, ceramics that resemble Oneota materials *(see below)* are sometimes found at Sandy Lake sites, suggesting some level of contact and/or trade between the inhabitants of central and southeastern Minnesota.

SOUTHEASTERN MINNESOTA • In the riverine environment of southeastern Minnesota, the Late Woodland has unique characteristics. Most notably, Native Americans here did not use wild rice as much. Wild rice was present in some areas along the Mississippi River, but not in enough quantities to serve as a major food resource. Instead, inhabitants of the region began to practice horticulture intensively. In addition to domesticated plants (squash, sumpweed) grown during the preceding period, corn and beans became increasingly important. As with wild rice to the north, use of corn may have stabilized seasonal subsistence patterns, allowing for more sedentary settlement and greater population growth. Because of climatic factors, corn cultivation was generally limited to southern Minnesota, and corn was not widely available to the more northerly peoples of east central Minnesota.

Other distinct cultural traits emerged during the Late Woodland in southeastern Minnesota. Although construction of conical burial mounds probably continued, a new mound form emerged. Native Americans here built so-called "effigy" mounds in the shape of familiar animals, such as snakes and bears. The most famous mound group of this type occurs at Effigy Mounds National Monument, on the Mississippi River in northeastern Iowa. Projectile points from this area are small and triangular, with both notched and unnotched bases. Three Late Woodland ceramic types are known in southeastern Minnesota: Nininger Cordwrapped Stick Impressed, Bremer Triangular Punctated, and Madison Plain *(Figure 6)*. In general, vessels are thin-walled and wide-mouthed with cord-roughened surfaces.

Late Woodland sites of the southeastern Minnesota type appear in the MNRRA corridor in Dakota and Washington Counties. Several sites possessing Late Woodland components are near Spring Lake. Nininger Cordwrapped Stick Impressed ceramics were first identified at the Sorg site (21DK1). Although a variety of lithic artifacts were present (triangular points, scrapers, knives, drills), subsistence data were lacking from the site's Late Woodland component. Similarly, Bremer Triangular Punctated was first defined at the Bremer Village site (21DK6). Other sites in the MNRRA corridor with similar

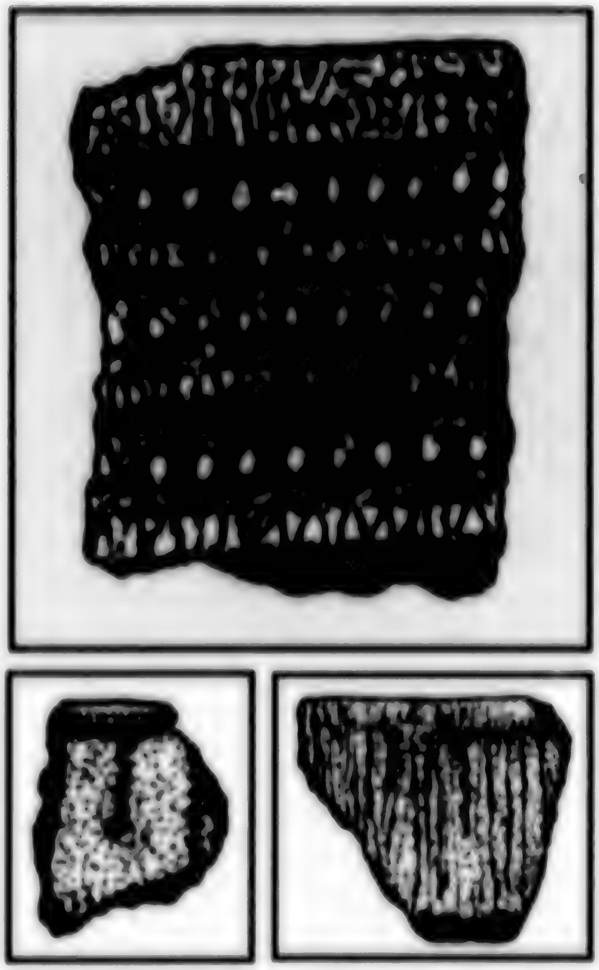


FIGURE 6. Examples of Late Woodland ceramic types: A), Bremer Triangular Punctate; B), Nininger Cordwrapped Stick Impressed; and C), Madison Plain. Reproduced from Scott F. Anfinson, edit., A Handbook of Minnesota Prehistoric Ceramics, Occasional Publications in Minnesota Anthropology Number 5. (St. Paul: Minnesota Archaeological Society, 1979), Figure 15)

Late Woodland materials include the Lee Mill Cave (21DK2), the Hamm (21DK3), and the Sibley House/American Fur Company (21DK11) sites.

Oneota Tradition (1,000-300 years B.P.) • Beginning about 1,000 years ago, a new cultural tradition known as "Oneota," emerged in the upper Mississippi River valley. Oneota probably represents Woodland peoples influenced by the ideas and lifeways of the Mississippian tradition, which arose to the southeast along the middle Mississippi River. In southeastern Minnesota, Oneota peoples were present until the first Euro-Americans arrived in the mid-1600s. The Oneota presence was more limited in east-central Minnesota, including the MNRRA corridor. In this region, it appears that the Late Woodland tradition continued until first contact with Euro-Americans.

In Minnesota, the Oneota tradition appears to emerge near Red Wing and Lake Pepin between about 1,000 and 800 years B.P. Subsequently, clusters of Oneota villages spread to the La Crosse area and the Blue Earth River valley in south-central Minnesota (Blue Earth Oneota), the river valleys of southeastern Minnesota (Orr Focus Oneota), and portions of central and southeastern Iowa. The Oneota subsisted on a wide variety of plants and animals. Most significantly, they practiced horticulture, cultivating corn, beans, squash, and other domesticated plants in gardens on river floodplains. They lived in villages on river terraces overlooking rich floodplain, although they established temporary camps associated with hunting and gathering of wild plants in upland locations. Oneota villagers sometimes erected protective walls or palisades. Oneota society was segmented by clan affinities. Oneota ceramics display variation in form and decoration, but in general, vessels are smooth-surfaced and tempered with crushed shell (*Figure 7*). Oneota peoples used a rich suite of bone and chipped and ground stone tools. They also made pipes carved from pipestone or ornaments fashioned from shell, bone, or copper.

Although Oneota sites are concentrated in southern Minnesota, evidence for an Oneota presence in the more

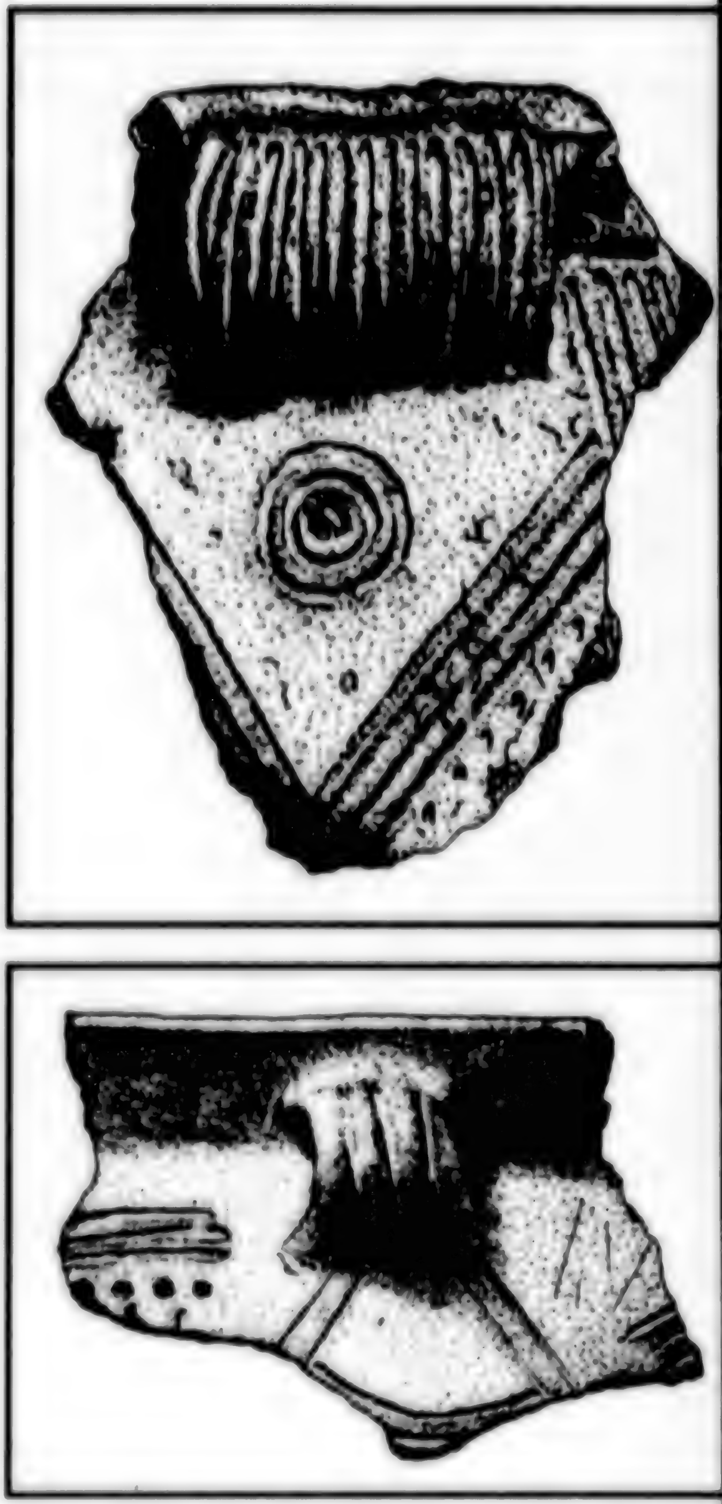


FIGURE 7. Examples of Blue Earth Oneota ceramics. Reproduced from Anfinson, Prehistoric Ceramics, Figure 17.

southerly portions of east central Minnesota has been found at several sites. In addition, the presence of ceramics with Oneota affinities (Ogechie ceramics) at Sandy Lake sites in central Minnesota suggests that there was some contact between the Oneota and more northerly peoples.

Within the MNRRA corridor, Oneota components have been identified at the Schilling site (21WA1), the Lee Mill Cave site (21DK2), the Point Douglas Townsite (21WA54), and the Grey Cloud Mounds site (21WA9). Evidence suggests that these sites were probably temporary camps occupied when Oneota peoples ventured north from their permanent village settlements to hunt for food or to trade. The Oneota component at the Lee Mill Cave site contains ceramics that resemble those found on Oneota sites in the Blue Earth River valley. The best excavated Oneota site in this region is the Sheffield site (21WA3), on the St. Croix River south of present day Marine on St. Croix. Oneota peoples used this site as a seasonal hunting and fishing camp some 700 years ago. No evidence of agriculture was found. As at the Lee Mill Cave site, the ceramics recovered from the Sheffield site resemble Blue Earth Oneota types. Interestingly, the site also contained Woodland components that predated, postdated, and were contemporaneous with the Oneota occupation. The relationship between the more southerly Oneota peoples and the Woodland peoples to the north is not well understood at present.[29]

Contact and Post-Contact Periods

When Europeans first entered the Midwest in the mid 1600s, several different Native American groups occupied Minnesota (*Figure 8*). By that time, European settlement in the East had forced some tribes west, resulting in a distribution of tribes different from what it had been a century before. In some cases, archaeologists have been able to link tribes present in the area in the 1600s to earlier peoples known only through archaeological data. In other cases, the link between historic tribes and cultures known only through archaeology is more tenuous. Contact with Europeans brought sweeping changes to Native American society, as Europeans introduced new values, lifestyles, ideas, technologies, and diseases.

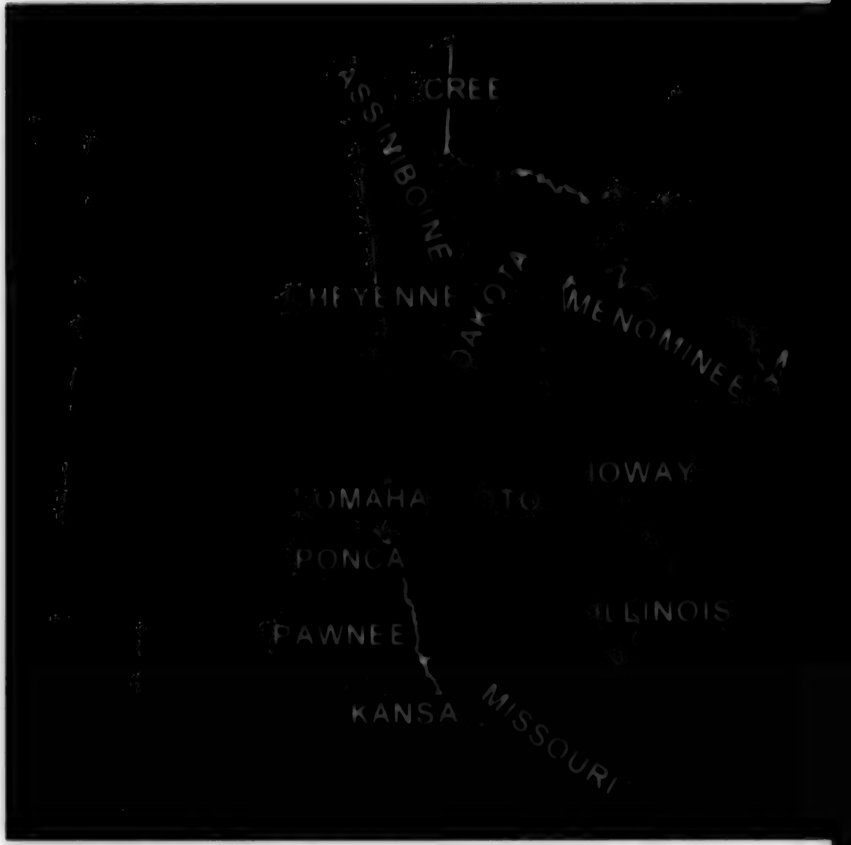


FIGURE 8. Generalized distribution of Native American groups during the mid 1600s. Reproduced from Guy E. Gibbon, "Cultures of the Upper Mississippi River Valley and Adjacent Prairies in Iowa and Minnesota," in Plains Indians, A.D. 500 1500: The Archaeological Past of Historic Groups, edited by K. H. Schlesier. (Norman: University of Oklahoma Press, 1994). Map 6.5.

Chiwere-Winnebago Language Group • When the French entered the area that is now Minnesota and Iowa in the late 1600s, speakers of the Chiwere-Winnebago language group, a subdivision of the Central Siouan language, lived there. These peoples were divided into several groups (including the Ioway, Oto, and Missouri) that were closely related by language, belief, culture, and kinship. Oral histories suggest that these groups had split apart from a common ances tral tribe. In particular, the Ioway and Oto were closely allied, often hunting together. The Winnebago, who lived in eastern Wisconsin, were closely related to the Ioway, Oto, and Missouri, and sometimes hunted with the more westerly tribes.

Although the French had heard reports about the Ioway through eastern tribes since the 1650s, the first contact between the two peoples occurred in 1676 at a Winnebago village near present-day Green Bay, Wisconsin. Father Louis Andre described the visiting Ioway in the following manner: "Their village which is 200 leagues from here is very large but poor, since their greatest wealth is in buffalo hides and red stone calumet pipes. They speak the language of the puants [Winnebago]." Subsequently, French explorers and traders ventured to the west, learning that the Ioway occupied southeastern Minnesota and northeastern Iowa, whereas the Oto occupied north central Iowa.[79]

Initially, the French had traded with the Ioway through the Algonquian-speaking tribes living to the east in Wisconsin and Illinois. However, as the fur trade spread westward, contact between the French and the Ioway became more frequent and direct. The French traded metal items, glass beads, guns, and ammunition to the Ioway in exchange for bison hides, and later, beaver pelts. Direct contact with the Ioway troubled the easterly Algonquian-speaking tribes, particularly the Mascouten. By losing their position as middlemen, these people feared that the Ioway and Oto would get firearms more easily, which would upset the balance of power. An intense intertribal rivalry developed, often resulting in war. By the late 1680s, the Ioway had abandoned their homes in southeastern Minnesota and northeastern Iowa and moved nearer to the Oto in northwestern Iowa. This move, however, did not protect them from their enemies for long. In the 1690s, the Mascoutens apparently pursued the Ioway into northwestern Iowa, attacking and decimating their large village. Subsequently, the Ioway and Oto moved farther to the west. In 1701-1702, the Ioway moved near Fort L'Huillier on the Blue Earth River in Minnesota at the invitation of French trader Pierre Le Sueur. However, after the fort was abandoned in 1702, the Ioway returned to the southwest.

Historic evidence links the Ioway to the archaeologically known Orr Focus Oneota. Orr Focus sites along the Upper Iowa River in northeastern Iowa contain European trade goods, as do several Orr Focus sites in southeastern Minnesota. By comparing historic documents and archaeological data, researchers have determined that the sites in northeastern Iowa corresponded to the Ioway villages visited by French fur trader Nicholas Perrot in 1685. Similarly, the Oto may be related to the Blue Earth Oneota of the Blue Earth River valley near present-day Mankato, although direct evidence is lacking.[80]

No Ioway or Oto sites are known within the MNRRA corridor. However, if these historic tribes are indeed related to earlier Oneota peoples, they had at least a limited presence. As discussed above, several sites with Oneota components have been documented in the St. Croix and Mississippi River valleys of northern, southeastern and southern, east central Minnesota. In particular, the Lee Mill Cave (21DK2) and Sheffield (21WA3) sites both yielded Oneota ceramics similar to Blue Earth Oneota specimens. Also, some ceramics found at Sandy Lake sites in central Minnesota share affinities with Oneota materials. Thus, it is likely that the people who came to be known as the Ioway and Oto passed through the MNRRA corridor via the major rivers, perhaps on seasonal hunting and gathering trips or on their way to visit other regions and peoples.

Eastern Dakota (Santee) • At the time of the first European contact, the Eastern Dakota or Santee inhabited much of Minnesota. The Santee included the Mdewakanton, Wahpeton, Wahkepute, and Sisseton, and lived along and east of the Mississippi River. The Santee were closely related by language and culture to the Yankton and Yanktonai (Nakota), who lived along the Minnesota River upstream from present day Mankato; the Teton (Lakota), who lived in western Minnesota near Lake Traverse; and the Assinboin, who occupied northwestern Minnesota. Together, these people came to be known to the French as the "Sioux," which was derived from the Algonquian term "Nadouessiw" meaning "snake" (i.e., "enemy").[11]

Early accounts indicate that during the late seventeenth century, the Eastern Dakota had adapted their subsistence and settlement patterns to the environment of the prairie/forest border. They occupied relatively permanent villages in forest areas, for example, near Mille Lacs Lake. From this base, the Eastern Dakota hunted mammals and waterfowl, fished, and gathered shellfish. Intermittently, they traveled to the western prairies to hunt bison, elk, and deer. Wild rice grew plentifully in the shallow lakes of the forest region. The Eastern Dakota also relied on a number of other plant foods, including starchy seeds, tubers, maple sugar, fruits and berries, and nuts. Unlike peoples to the south, the Eastern Dakota did not intensively cultivate corn, beans, or squash (presumably because the climate of east central Minnesota did not favor horticulture).

On the basis of written accounts, the Eastern Dakota used tools made of stone and bone, cooked in earthen pots, and buried their dead with grave goods in earthen mounds. Links to earlier known archaeological cultures are tenuous at present. Excavations at village sites and burial mounds near Mille Lacs Lake suggest that the Eastern Dakota had occupied the area for at least several centuries prior to contact with the French. During this period, the Eastern Dakota may have produced ceramics of the Sandy Lake variety, which replaced Kathio and Clam River ceramics across central Minnesota rather abruptly about 1,000 years B.P. This sudden appearance of Sandy Lake ceramics may represent the arrival in the region of the Eastern Dakota, who displaced the indigenous Woodland populations. However, archaeologists have not been able to establish a connection between the late prehistoric archaeological cultures and the early historic tribes of northern and eastern Minnesota.

Few archaeological sites associated with Eastern Dakota occupation are recorded for the MNRRA corridor. The approximate locations of early nineteenth century communities such as Kaposia or Pine Bend are known, but no archaeological work has been completed at these sites. In the 1980s, the University of Minnesota conducted archaeological excavations at the Little Rapids (21SC27) site, a nineteenth century summer planting village located a short distance up the Minnesota River. Data from the excavations, supplemented by historic records and oral interviews with descendants of the village's residents, furnished detailed information about nineteenth century lifeways at the village, especially those of its female inhabitants. Archaeologists conducted more limited excavations at the probable location of Black Dog's village, which the Dakota occupied from about 1750 to 1850. The Dakota Internment Camp, where some 1,500 individuals were held following the Dakota Conflict of 1862, is located in the river bottom below Fort Snelling but has never been investigated archaeologically. Similarly, Pike Island (located at the confluence of the Mississippi and Minnesota rivers) was frequently occupied by the Eastern Dakota but has never been investigated.[12]

Many significant changes occurred in the lifeways, material culture, and geographic distribution of the Eastern Dakota in the years following their initial contact with the French. It is likely that for at least 100 years before the French arrived, the Dakota had been venturing into the western prairies to hunt bison with increasing regularity. The cooler and moister conditions of the Little Ice Age may have prompted this shift by making subsistence more difficult in the eastern forest regions. But the Chippewa may have forced the Dakota to move, as the Chippewa migrated south and west from the Lake Superior region in response to the fur trade. European and American expansion and the associated tribal migrations intensified Dakota use of the Mississippi River in the MNRRA corridor. For eons, Native Americans had adapted to environmental changes and the movements of other Native American groups. Increasingly, European and American expansion would define Native American lifeways, and in ways as dramatic as the glaciers, transform the river and its ecosystems.

FIGURE 1. Father Louis Hennepin and Antoine Auguelle "discover" St. Anthony Falls in 1680. Artist: J. N. Marchand. Minnesota Historical Society.

Chapter 8

Discovery and Dispossession

To French explorers and traders probing westward from eastern Canada in the early 1500s, rumors of a great river stirred fantasies that only the unknown can evoke. Was it the Northwest Passage, that long hoped for shortcut to the riches of China? They knew that whoever found that fabled passage would gain enduring fame and wealth. To talk of the Mississippi River's discovery, however, is an ethnocentric endeavor. To the Dakota and other Native Americans, the great river was as well known as a local freeway to an urban commuter. It was their daily and seasonal highway. But it was more. It was their front and back yards. It was their supermarket as well as their superhighway. They fished, hunted, gathered plants, planted crops, swam, and prayed in or near the river. The contrast between European discovery and Native American familiarity could not have been greater. The stories of European discovery lay bare this contrast.

Dakota life changed dramatically as French, British and American explorers and traders found the MNRRA corridor. Where the Dakota lived, what they hunted and ate, and the tools and other material objects they relied upon changed. They began the era as the region's dominant people and ended it, in 1854, with a forced exodus away from the river they had known and used for so long. While the French and British left little evidence of their presence in the MNRRA corridor, the Americans took it over, transforming not only Dakota life but the river valley's landscape and ecosystems.

The French

During the French era, the Mississippi evolved from a rumor into a thoroughfare of exploration and Euro Indian commerce. The French period on the upper Mississippi covers approximately 100 years, but the French presence was limited and sporadic. The French began exploring eastern Canada in the early 1500s. In 1534 Jacques Cartier sailed up the St. Lawrence to the site that would become Montreal. But the French only established small fishing camps and trading sites. Samuel de Champlain finally founded a settlement at Quebec in 1603 04, and the French began sending traders and explorers into the continent's depths. In 1623 or 1624, Etienne Brule became the first to report on rumors of a vast lake (Lake Superior) to the far west. Ten years later, in 1634, Jean Nicolet voyaged into Green Bay, contacting the Winnebago, or Ho Chunk. And in 1641, Recollet priests Charles Raymbault and Isaac Jogues became the first to document the discovery of Lake Superior. They met the Saulteurs, or Chippewa, and reported on news of the Dakota, who lived on a great river, only 18 days away. These are the recorded accounts. The coureur de bois (independent, illegal fur traders, who ranged in advance of the official explorers and legal traders) may have visited the Great Lakes, the Dakota and the M[illegible]r, but we may never know.

Medard Chou[illegible] Sie[illegible]es Groseilliers, and Pierre d'Espirit, Sieur de Radisson, might have been the first

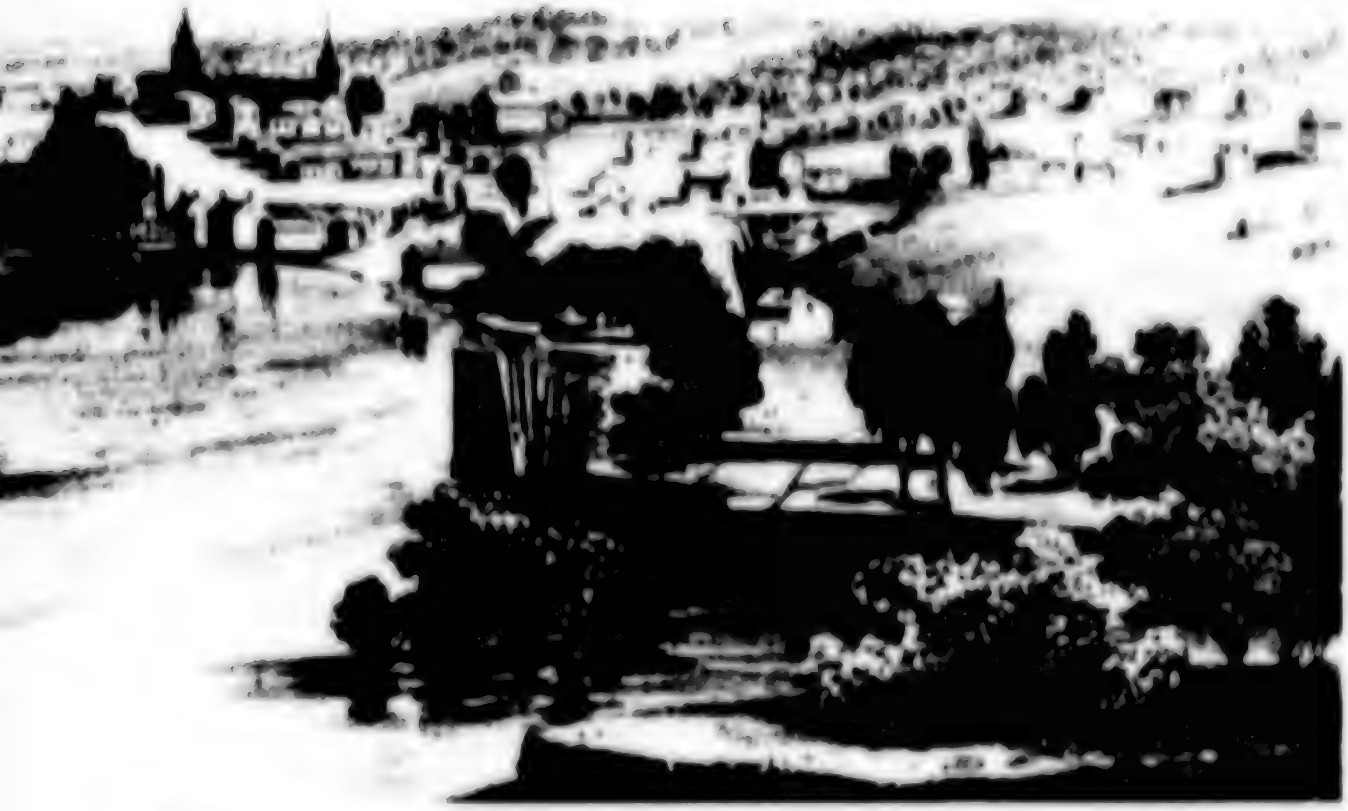
Europeans to see the upper Mississippi. Between 1654 and 1660 they conducted fur trading expeditions into the western Great Lakes and supposedly beyond. On at least one voyage, they purportedly canoed into Green Bay and up the Fox River. They then crossed over a short portage and into the Wisconsin River and paddled down to the Mississippi River. This route–the Fox-Wisconsin waterway–would become one of the principal highways of exploration and trade. Groseilliers and Radisson possibly traveled upriver as far as Prairie Island. The evidence is sketchy, and Minnesota historian William Watts Folwell calls it too far fetched to give Radisson and Groseilliers the title of the river's European discoverers.[2]

By the 1670s, the French were poised to explore the Mississippi River. They had posts as far west as La Pointe, on Madeline Island, in Chequamegon Bay. Rumors of the "Mechassipi" or "Micissipi" grew and inflamed the hope that it was the Northwest Passage. Jean Talon, the indendant or head of finance, commerce and justice, in New France, chose Louis Joliet and Father Jacques Marquette to lead an expedition to the far-off river. On May 17, 1673, they left Michilimackinac, near Sault Ste. Marie, took the Fox-Wisconsin waterway, and glided into the Mississippi on June 17, 1673, becoming the first Europeans to unquestionably discover the river. From here the party drifted south, hoping to find the river's mouth. After a month they decided that the river flowed into the Gulf of Mexico. Fearing the Spanish and Native American tribes, they turned around and headed back to the Illinois River. Traveling up the Illinois, they crossed into Lake Michigan. Although the French had discovered the upper Mississippi River, the reach above the Wisconsin River's mouth lay unexplored. Joliet's account and France's desire to expand its claim to America, to capture the trade, and to find the route to the Far East, however, spurred the French government to want more detailed information about the river and its inhabitants.[3]

Merchants from Montreal and Quebec, hoping to be the first to seize the fur trade of the region, assembled a party to visit the Dakota and chose Daniel Greysolon, Sieur du Luth, as their leader. He left Montreal on September 1, 1678. The next summer, on July 2, 1679, he reached the Dakota villages on Mille Lacs Lake. Du Luth then returned east, leaving three men behind to learn more about the tribe and about a route to the western sea. Boosting French hopes, these men heard of a great, salty body of water only 20 days to the west. Some speculate that this might have been the Great Salt Lake, although the French hoped it was the Pacific Ocean. This news and his desire to discover the storied western river made du Luth want to return as soon as possible.[4]

The French had now been near the Mississippi's headwaters and at Prairie du Chien, but the river in between remained a mystery, and others hoped to beat du Luth to the Northwest Passage and the furs of the upper Mississippi. In 1677 Robert Cavelier, Sieur de la Salle, gained royal permission for an expedition to discover the river's mouth and

FIGURE 3. Looking down on Phalen Creek's mouth and the beginnings of St. Paul. When Hennepin, Auguelle and Accault landed here on March 19, 1680 they stood between worlds, one represented by the ancient Hopewell burial mounds on Dayton's Bluff and the other by the low hills that would become downtown St. Paul. Artist: J. M. Stanley. Minnesota Historical Society.

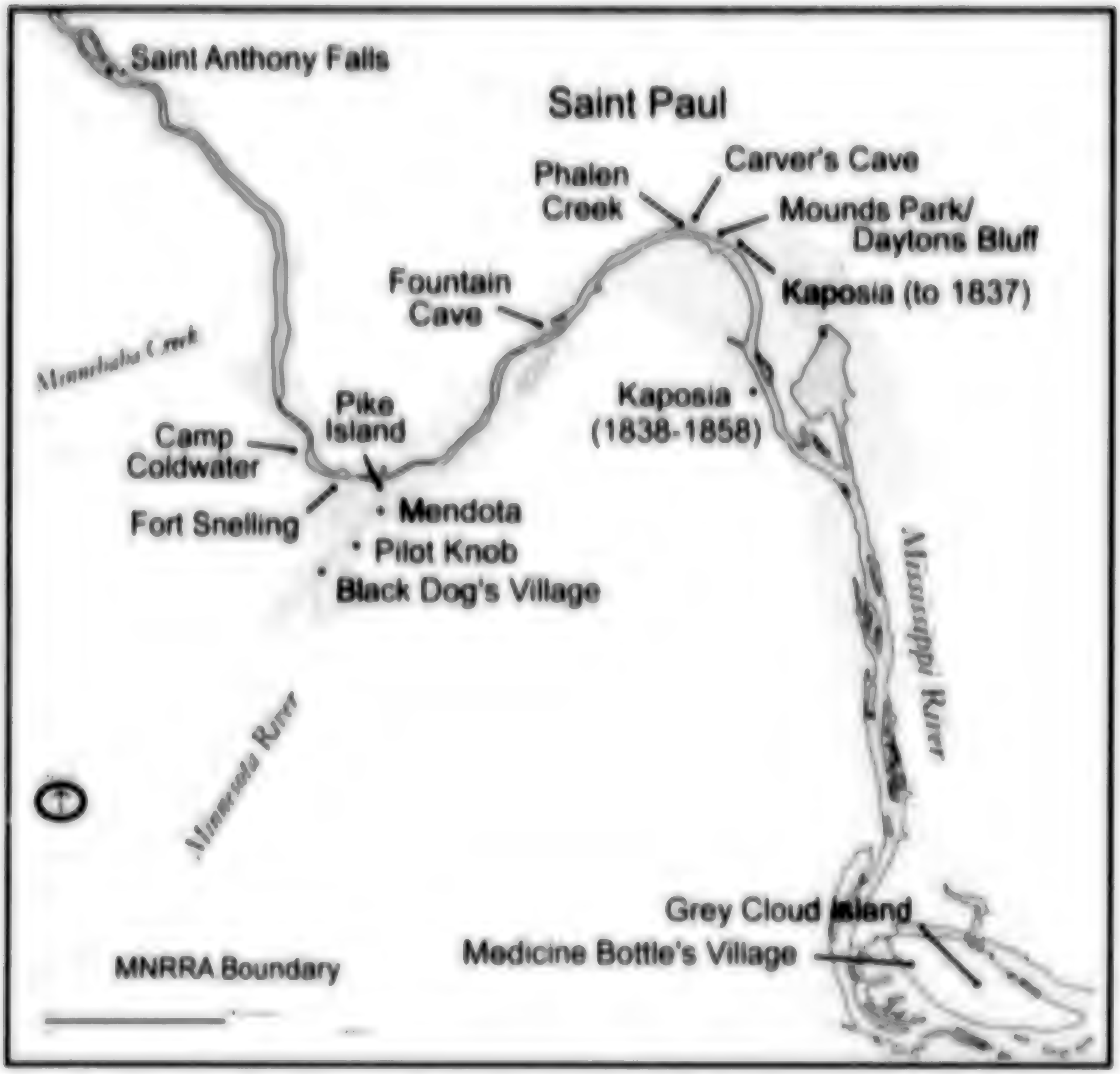


voyage. Delays, however, left him only as far as a fort on the Illinois River, just below Peoria, in January 1680. When directed to return to Montreal, La Salle chose Michael Accault, a voyageur, to lead an expedition to the Mississippi, accompanied by Antoine Auguelle and Father Louis Hennepin.

The small party headed down the Illinois on February 29, 1680. As they paddled upstream, they met a Dakota war party of 120 men in 33 canoes. After convincing the Dakota that their enemies, the Miami of Illinois, had already gone west, the two parties returned upriver. Nineteen days after beginning their journey, Hennepin estimated they were 11 miles below St. Anthony Falls, near the mouth of Phalen Creek (since filled in), just upstream of Mounds Park (*Figures 2 and 3*). So the first recorded European visit to the MNRRA corridor occurred about March 19, 1680. The European discovery of the falls would have to wait. Rather than continue upriver, the Dakota abandoned their canoes and marched overland to Mille Lacs Lake, where they arrived after five days.

Three and one half months later, on July 1, 1680, the Dakota, taking the Frenchmen along, left Mille Lacs and started off to hunt buffalo in southwestern Minnesota. Traveling in small groups, they rendezvoused at the Rum River's mouth at Anoka. Hennepin and Auguelle received permission to continue down the Mississippi to find La Salle, who was to have supplies and reinforcements. Accault stayed with the hunters. As they paddled downstream, Hennepin and Auguelle came to the great falls of the Mississippi, which Hennepin named for his patron saint, Anthony of Padua (*Figure 4*). (For Hennepin's description of St. Anthony, see Chapter 6, which focuses on the falls.)

FIGURE 3. Dakota, European and American interactions became increasingly more intense in the lower Mississippi National River and Recreation Area corridor between 1680, when the French arrived, and 1853, when the Minnesota Territorial government forced the Dakota out.



Hennepin and Auguelle continued downstream but apparently did not make it to the Illinois River. Soon Accault and the Dakota hunters joined them somewhere below the St. Croix. Together they headed back to Mille Lacs.

Meanwhile, du Luth, itching to reach the Mississippi and the Dakota, left his post on Lake Superior, near Thunder Bay, crossed over the continental divide, and canoed down the St. Croix River. At the St. Croix's mouth, he heard rumors of some Europeans who had passed downriver shortly ahead of him. Fearing they could be English or Spanish, expecting they might be French, he took a canoe and pursued them. On July 25, 1680, he found the French and Dakota paddling upriver and "rescued" Hennepin's party. Together they continued on to Mille Lacs, where they arrived on August 14. On this trip the Dakota traveled up the river to St. Anthony, portaged around the falls and continued up the Mississippi and Rum Rivers. Late in September, the Frenchmen finally returned east. Since they left in canoes and took the Fox-Wisconsin route, they probably went down the Mississippi through the MNRRA corridor again.[7]

To the extent that we can trust Hennepin's flawed and exaggerated account, we learn for the first time about Dakota culture and the Mississippi River in the MNRRA corridor. From Hennepin we learn that to the Dakota the falls was a place of energy, spirituality and history (see Chapter 6).[8] As Hennepin's party descended the Mississippi below St. Anthony Falls, they found some members of a Dakota band he called the Issati camped on an island. They had a great deal of buffalo meat. Two hours later, 15 or 16 Dakota, who had been with the Frenchmen at the falls, "came with their war clubs in hand, pulled down the wigwam of our hosts, and took all the meat and bear's grease they found." Hennepin learned that those with the meat had gone ahead and, "contrary to custom," had killed what they wanted and scared the rest away. Therefore, those hunters coming later had the right to take the meat.

After their early expeditions, the French hoped to establish a series of posts in the interior to hold off Spanish and English expansion. As a result, the French began building posts on the upper Mississippi River. These posts were south of the MNRRA corridor, however, near Trempealeau, Wisconsin, on Lake Pepin, and on Prairie Island, just above Red Wing.[10] During the 1680s, Nicholas Perrot built Fort St. Antoine on Lake Pepin. From the 1680s to the mid-1690s, Pierre Charles Le Sueur worked for Perrot, trading with the Dakota on the upper Mississippi River. In 1695 Le Sueur returned to France and helped the French cartographer Jean Baptiste Louis Franquelin draw "the first accurate map of the upper Mississippi watershed." The map shows 10 villages east of the Mississippi and 12 west of the river centered around Mille Lacs Lake.[11] In 1699 Le Sueur returned to America, sailing up the Mississippi River to Biloxi and from there canoeing all the way to Minnesota. Entering the MNRRA corridor, he reached the mouth of the Minnesota River on September 9, 1700, and pushed up the Minnesota to the mouth of the Mankato River, where he built Fort L'Huillier for the Dakota trade.[12] While Le Sueur's voyage seemed to portend a surge in French trade, that trade did not follow.

French expansion into the upper Mississippi River faltered during the late seventeenth century. By 1696 the French began gathering their forces around Montreal under pressure from Iroquois attacks. Then, from 1702 to 1713, France became embroiled in the War of Spanish Succession in Europe and turned its attention away from Canada and America. Under the Treaty of Utrecht in 1713 that ended the war, France lost its claims to Nova Scotia, Newfoundland, and its lands around Hudson Bay. Although the French returned to the Great Lakes shortly thereafter, they did not establish a post (Fort Beauharnois) on the upper river again until 1727, and it was well downriver from the MNRRA corridor at Frontenac, Minnesota. Ten years later, the French abandoned the fort and, for the most part, gave up their efforts among the Dakota and on the upper Mississippi River, focusing instead on the Great Lakes and Ohio River Valley. Still, the French managed to build another fort on Prairie Island in 1752. But the potential for further French involvement ended with the French and Indian War, which began in 1756 and concluded with the Treaty of Paris on February 10, 1763. Under the treaty, the French transferred their claims in Canada and east of the Mississippi in America to the British, except for New Orleans.

The impact of French trade on intertribal relations and tribal migrations exceeded the French presence and would increase the Dakota's use of the MNRRA corridor. At the time of French contact, there were four primary Dakota groups: the Mdewakantons, Wahpekutes, Sissetons, and Wahpetons. The Mdewakantons occupied the area around Mille Lacs Lake and were known as the "People of the Spirit Lake" or "People of the Mystic Lake." The Wahpekutes lived near the Mdewakantons, and the Sissetons and Wahpetons resided to the north and west.[14] When Le Sueur returned to the upper river in 1700, after being gone for five years, he discovered the Dakota had begun migrating west and south from Mille Lacs.[15]

Some scholars argue that the Chippewa had started pushing the Dakota out of their homelands. Since the Chippewa had better access to guns and ammunition, the argument goes, they were more powerful than the Dakota. Other scholars disagree, contending that certain forces pulled the Dakota away from Mille Lacs. Dakota historian Gary Anderson suggests that the presence of French traders on the Mississippi at Lake Pepin and below helped draw the Dakota out of the Mississippi Headwaters region by the 1720s. And the buffalo and horse provided a strong incentive for the Sissetons and Wahpetons to begin moving toward the plains.[16] A combination of these factors most likely convinced the Dakota to leave their traditional villages around Mille Lac Lake.

By the 1750s the Dakota had largely abandoned their ancestral homeland. The Mdewakantons had begun living in semipermanent villages along the lower reaches of the Minnesota River, on the Mississippi below St. Anthony, and on the St. Croix. When Pierre Boucher, Sieur de Boucherville, arrived at Lake Pepin in September 1727 to build Fort Beauharnois, he hoped to find the Dakota there, but they had gone to St. Anthony Falls. Anderson suggests that the falls might have become the primary gathering place for the eastern Dakota by this time. The Dakota not only moved, they began changing their lifestyle. Between 1680 and 1727, they extended their buffalo hunting trips to the plains from a few weeks to a few months. Even though the Dakota had begun migrating south and west, they remained the strongest tribe on the upper Mississippi River from its headwaters to well below Lake Pepin and still asserted control over the St. Croix River and lower Chippewa River.[17] Overall, they remained very mobile.[18]

As the Dakota settled along the Mississippi River below St. Anthony Falls and on the Minnesota River, traffic through the MNRRA corridor increased. The Dakota, other Indians, and traders often traveled through the MNRRA corridor on their way to and from villages on the main stem or on the Minnesota. The Chippewa came down from the headwaters to attack the Dakota, using the Mississippi, St. Croix, Rum and other rivers that fed into the main stem. Traders ventured up the Mississippi to the Dakota villages within the corridor or turned up the Minnesota to Dakota villages there. They also portaged around St. Anthony and paddled upstream to trade with the Chippewa. The Dakota employed the Mississippi and the Minnesota, St. Croix and other tributaries to travel between their villages, to hunt, gather, and go to war.

Whether the Dakota moved out of their homeland voluntarily or retreated from it, we know that intertribal warfare increased greatly as the French spread westward. When the French built Fort Beauharnois on Lake Pepin in 1727 and Fort St. Charles on Lake of the Woods in 1732, they bypassed the Chippewa. The Chippewa resented this, both because it took away their middleman position in the trade and because it brought firearms directly to their enemies. As a consequence, warfare between the Chippewa and Dakota intensified and became a central part of Dakota life in the MNRRA corridor. The French did not invent intertribal warfare, but they unquestionably helped define its nature and extent, as would the British and Americans.[19]

The British, 1763-1815

The British did not immediately fill the political vacuum created by their victory over the French, but no economic vacuum occurred. French and Spanish traders continued to frequent the area, the French coming up from New Orleans and the Spanish from St. Louis. When the British did enter the fur trade of the upper Mississippi River valley and the western Great Lakes, they tried a different system. Rather than sending traders to the tribes, they expected the tribes to come to them at posts like Michilimackinac, which was at the border of Lakes Michigan and Huron. The policy failed. In 1767 the British granted licenses to traders and let them rush into the interior, setting off rampant competi tion. By the 1780s many English traders worked among the Dakota. No evidence exists, however, that the French, Spanish or English established posts in the MNRRA corridor during the British era. Prairie du Chien was the primary trading place on the upper Mississippi. Not only did various tribes meet French, Spanish and British traders there, the traders fanned out from the wilderness entrepot. British and French traders canoed the MNRRA corridor regularly to trade with the Dakota and Chippewa."

Not many British explorers or traders left detailed accounts of their travels on the Mississippi River or of their encounters with Native Americans. Fortunately, Jonathan Carver, 1766-67, and Peter Pond, 1773-75, did. Carver had asked to go west to help England secure the lands it had won from France. He had fought in the French and Indian War and knew well the French influence in the interior. After securing a commission from Robert Rogers, the commandant at Fort Michilimackinac, Carver set out for the Mississippi River from the fort on September 3, 1766. Rogers sent Carver west, hoping to discover the Northwest Passage. More pragmatically, he directed Carver to convince the Dakota and other tribes to visit the British posts and abandon the French and Spanish traders. Misinformation, plagiarism, deceit, and exaggeration plague Carver's account. So his observations, like those of many early explorers, warrant caution.

On November 8, 1766, somewhere between Lake Pepin and the St. Croix River's mouth, Carver met the Dakota or "Naudowwessee" as he called them. Stopping for the day, he read them a speech from Major Rogers and offered them rum, tobacco and a wampum belt, hoping to persuade them to visit the British posts. To his journal, he confided the Chippewa resented traders who bypassed them. A band of the Chippewa (possibly the Pillager Band), Carver wrote, robbed traders they caught on the Mississippi between the St. Croix and Lake Pepin. The traders, according to Carver, usually went up and down the river in large groups for security. Carver left the next day and reached the mouth of the St. Croix.

Carver expands our knowledge of Dakota social and cultural traditions within the MNRRA corridor. On November 14, he came to "the great stone cave calld by the Naudowessee," he said, "Waukon Tebee, or in English the house of spirits." The cave would take Carver's name. Carver "discovered" something already old to the Dakota. He found "many strange hieroglphycks cut in the stone some of which was very a[n]cient and grown over with moss." *(Figure 4)* Like a graffiti vandal, he etched the king

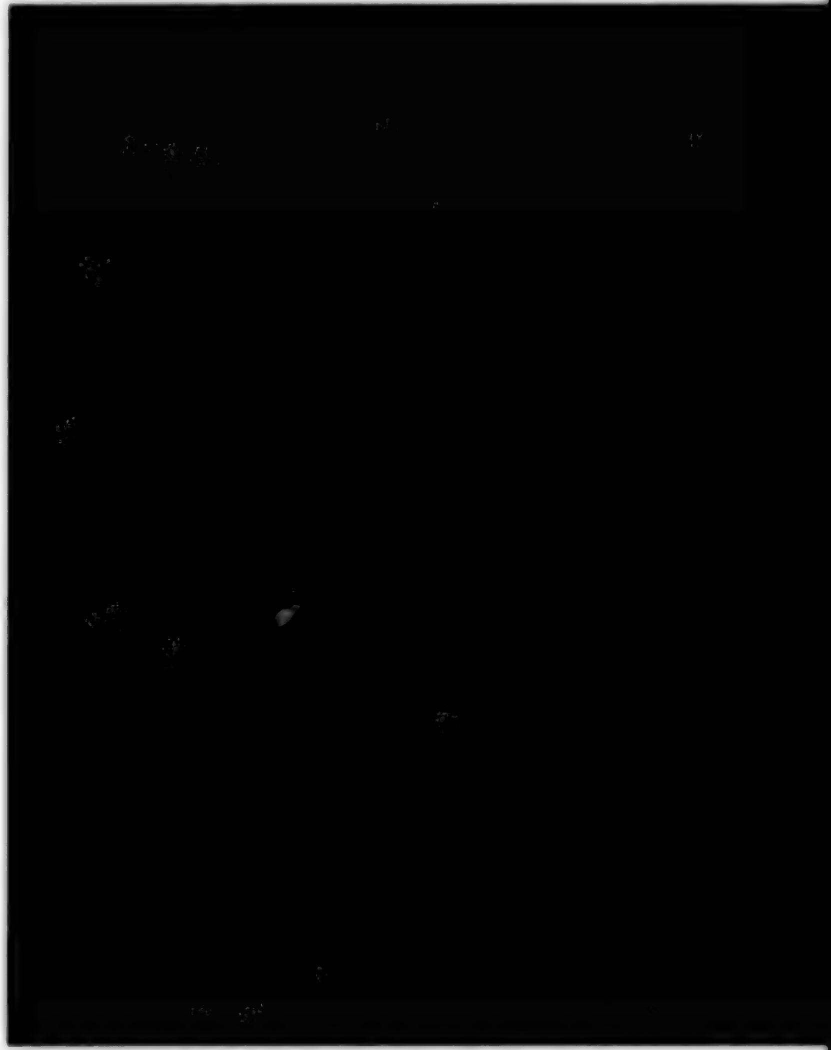


FIGURE 4. These petroglyphs in Carver's Cave demonstrate the historical and spiritual significance places within the MNRRA corridor held for the Dakota and other tribes. Theodore H. Lewis, The Northwest Archaeological Survey, 1898.

of England's coat of arms among the Native American characters. From the cave, Carver headed up to St. Anthony Falls on the 18th. After visiting the falls, Carver returned downstream and canoed up the Minnesota River where he camped with the Dakota for the winter.[illegible]

The following April, Carver heard about "an annual council" to be held near the cave he had visited. The chiefs of several bands planned to attend. Such a meeting would provide Carver the opportunity to harangue the Dakota to go to the British and to stop trading with the French. So on April 26, 1767, he left what he termed the "Grand Encampment" of the Dakota on the Minnesota River and traveled down to the Mississippi, where he arrived on April 30. The next day he met the Dakota near the cave, possibly at or near a village that would become Kaposia, and got himself invited to the council. Eight bands attended.[illegible]

The hereditary chief of the Mottobauntowha band (possibly Wabasha I) presided at the conference. The chief addressed the advantages and disadvantages of going to the French and British. His people feared disease if they traveled to the French in Louisiana, although at least one chief still favored the trip (although the French usually came to the Dakota). Carver comments that while the Native Americans were "great travelers," few were willing to make the journey to Michilimackinac. The chief encouraged Carver to return again with more traders to bring them guns, powder, tobacco and other goods. The Dakota especially wanted guns for war.[illegible]

Intertribal warfare intensified during the British era, as the Chippewa expanded farther south and west into Minnesota, as the Dakota became more well armed, and as fur animals and game supplies dwindled. Prior to entering the council, Carver had learned that an Iroquois man, whom he had employed as an interpreter the previous fall, had joined a band of Chippewa that had stolen down to the Mississippi to attack the Dakota.[illegible] By the 1790s the Dakota and the Chippewa fought along the Mississippi River from St. Anthony Falls to Prairie du Chien so intensely that one British trader claimed few Indians came to the area.[illegible]

Peter Pond, another British adventurer to leave an account during this era, had less grandiose goals than Carver. He simply wanted to bring out as many furs as he could. In 1773, Pond shows, fur traders had established themselves throughout the upper Mississippi River region and especially among the Dakota of the Mississippi and Minnesota Rivers. Upon arriving at Prairie du Chien, Pond found "a Larg number of french & Indans Makeing out thare arangements for the InSewing winter and Sending of thare canues to Differant Parts Like wise Giveing Creadets to the Indans who ware all to Randavese thare in Spring." Pond had nine traders that he sent to different places, including two that he accompanied up the Minnesota River in October. During the winter, he traded with the Dakota who visited him and noted that he had a French competitor nearby who had been trading with the Dakota for several years. Although Pond does not indicate that traders wintered or bartered within the MNRRA corridor, he demonstrates that numerous British and French traders had infiltrated the Dakota lands. At a minimum, he shows, traders traveled on the Mississippi through the corridor to reach bands on the Minnesota River and to get to the Chippewa at the Headwaters.[illegible]

After returning to Michilimackinac, Pond learned that the conflict between the Dakota and Chippewa had worsened. Fearing that the trade would collapse, the British sent their traders out with wampum belts to bring as many chiefs to Michilimackinac as possible. In1775, after another year of trading on the Minnesota River, Pond headed back to the British entrepot bringing eleven Dakota chiefs with him for the treaty negotiations. At the confluence of the Minnesota and Mississippi, a delegation from the Chippewa, accompanied by traders who had spent the winter near the Headwaters, startled Pond's party. Given the recent battles, Pond recalled, "I was Much Surprised to Sea them So Ventursum among the Peaple I had with me, for the Blad (blood) was Scairs Cald the Wound was yet fresh." The two parties then proceeded together to Michilimackinac, somehow avoiding serious conflict. Hoping to end the intertribal war and ensure their profits, the British tried to convince the Dakota and Chippewa to make the Mississippi River the fixed boundary between the two tribes. The traders succeeded in getting the Dakota to agree not to cross the Mississippi to the east and the Chippewa not to go to the west. The attempt to create a dividing line between the Chippewa and Dakota failed, however. Despite their statements at Michilimackinac, the Dakota still viewed some lands east of the Mississippi as theirs.

British sovereignty (ignoring Dakota claims) over the eastern MNRRA corridor technically ended with the Treaty of Paris, in 1783, that concluded the American Revolution. By that treaty, United States now owned the land to the east of the Mississippi. The Spanish still claimed the land west of the river. In reality, British traders continued to dominate the fur trade in the region and with it the politics and economy. British traders, especially those of the Northwest Company (established in 1787), continued building posts in Minnesota and Wisconsin, including sites at Grand Portage, Fond du Lac (at the mouth of the St. Louis River), Prairie du Chien, Sandy Lake and Leech Lake.

The only official American effort to establish its presence came after the Louisiana Purchase in 1803, by which America gained control over an 825,000,000 square mile tract west of the Mississippi from France for $15,000,000. (France had reacquired Louisiana from Spain three years before.) General James Wilkinson, determined to eliminate the British influence in the region, dispatched Zebulon Pike up the Mississippi from St. Louis to the river's headwaters *(Figure 5)*. Wilkinson ordered Pike to choose the best sites for military posts and obtain the land for them from the Native Americans. He also directed Pike to prepare the way for government trading posts, make alliances with the Chippewa and Dakota, stop intertribal fighting, and locate the Mississippi's source.

Pike left St. Louis on August 9, 1805. As he proceeded up the Mississippi River, he found an active and thriving fur trade. At Prairie du Chien he picked up James Fraser, a trader who was planning to winter with the Dakota bands on the Minnesota River. At Lake Pepin, another trader, Murdoch Cameron, joined Pike's expedition. Cameron also planned to trade with the Dakota on the Minnesota River. When they reached the St. Croix River, on September 19, Fraser and Cameron begged leave to undertake some business in the area and departed. Three miles below the mouth of the Minnesota River, Pike came upon a "Mr. Ferrebault's" (Jean Baptiste Faribault) camp. The trader's piroque had been damaged, forcing him to stop. There is no indication that Faribault made this camp a trading site or if, as had happened to Pike many times already, he had laid up to fix his boat.

On September 21, Pike reached Kaposia, where he had breakfast. He counted 11 lodges but the band was out col

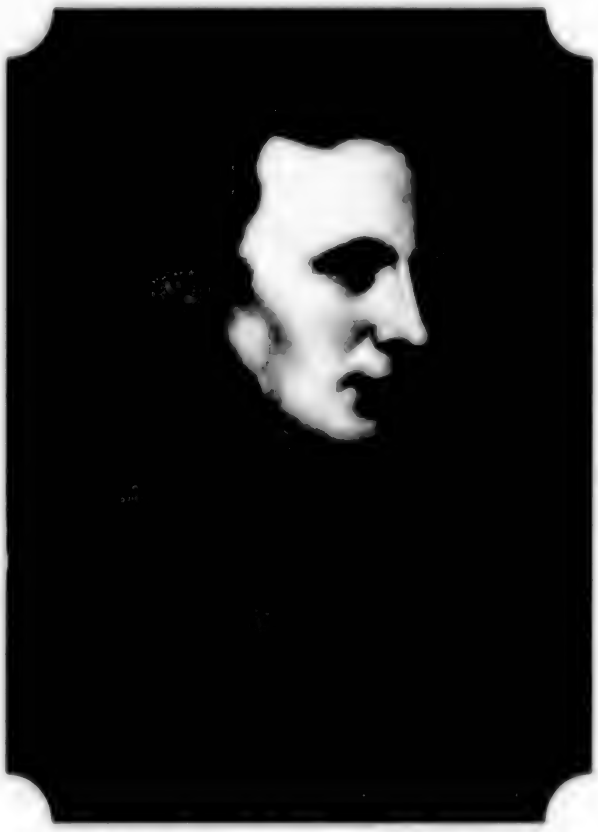


FIGURE 5. In 1805, Lieutenant Zebulon Pike tried to assert American control over the upper Mississippi River. America had acquired the land west of the river through the Louisiana Purchase of 1803. Artist: Charles Wilson Peale. Independence National Historic Park.

lecting "fols avoin," or wild rice. Two miles farther up, he met a small Dakota camp of four lodges. Whether this was a separate village or a temporary camp is not clear. When Pike reached the large island at the Minnesota's mouth that bears his name, he set up camp on the island's northeast point and waited for the Dakota.[33]

He did not wait long. The next day Petit Corbeau or Little Crow and about 150 of the band's warriors arrived. Later that day Pike went up the Minnesota River to the Dakota village where Cameron had his post. While the Dakota warriors had left, they had returned upon hearing of Pike's arrival. The following day, at noon, Pike began negotiating with seven Dakota chiefs at Pike Island. He wanted Dakota lands at the mouths of the St. Croix and Minnesota Rivers. Although only two Dakota leaders signed, Little Crow and Le Fils de Pinchow or Pinichon, the cession would become fact. The Dakota gave up some 100,000 acres for which the Senate initially agreed to pay only $2,000.[34]

Unlike Carver and Pond, Pike delivers some insights about the river itself in the MNRRA corridor. After passing the St. Croix's mouth on his journey upstream, Pike remarked that the river became surprisingly narrow. To emphasize the point, he tested how many strokes he need to cross in his bateau. It took only 40. And, he wrote, "The water of the Mississippi, since we passed Lake Pepin has been remarkably red; and where it is deep, appears as black as ink. The waters of the St. Croix and St. Peters (Minnesota), appear blue and clear, for a considerable distance below their confluence."[35] Pike offers rare details about the river above St. Anthony Falls. On October 1, after portaging around St. Anthony Falls, Pike initially found the river deep enough. Within four miles, however, the river became shallow, and his party struggled for the rest of the day, having to fight their way over three rapids. The next day the Mississippi became so difficult Pike claimed that anyone less determined would have turned back. His party passed some large islands and more rapids. For much of the day they waded in freezing cold water, "to force the boats off shoals, and draw them through rapids." The river winds only some 25 miles from St. Anthony Falls to the Crow River's mouth. For Pike's crew, it seemed an interminable distance. They did not reach the Crow River until October 4.[36]

Like the British traders and explorers, Pike found intertribal warfare rampant and hoped to end it. Only his arrival had stopped the Mdewakantons living up the Minnesota River from going to war. Upon reaching the Crow River, he found one reason why the Dakota had probably set off to attack the Chippewa. On October 4, Pike recorded that "Opposite the mouth of Crow river we found a bark canoe, cut to pieces with tomahawks and the paddles broken on shore; a short distance higher up, we saw five more; and continued to see the wrecks, until we found eight." Pike's interpreter recognized the canoes as Dakota and some broken arrows as Chippewa. The Chippewa had carved marks on the paddles, indicating the number of men and women they had killed.

On his return trip down the Mississippi, Pike hoped to convince the Dakota to make peace with the Chippewa. So on April 11, when he again reached Pike Island, he sent for the Dakota chiefs. Le Fils de Pinchow came soon after and agreed to host a council. At sunset, the Dakota called Pike to Le Fils de Pinchow's village, about nine miles up the Minnesota. Pike found some 40 Dakota chiefs waiting. They represented the Mdewakantons, Sissetons and Wahpetons. The Dakota numbered about 100 lodges or 600 people. As this was the same time of year that Carver had attended a great annual Dakota conference in 1766, Pike may have arrived at the time of another annual meeting. "The council house," Pike recorded, "was two large lodges, capable of containing 300 men. In the upper were 40 chiefs, and as many pipes, set against poles; . . ." Pike placed some Chippewa pipes that he had acquired next to the Dakota pipes as a gesture of his desire to establish peace between the tribes. Pike apparently had little effect. The next day as he headed back down the Minnesota River, some Dakota from a number of lodges about three miles above the mouth hailed him. Although they initially received him well, the Dakota forcefully let him know they intended to go to war.[57]

Pike's expedition signaled a new era. His was the first of an increasing number of missions to establish America's political and economic control over the upper Mississippi. But for now, the British and French traders remained active on the upper river. Demonstrating how much activity he found on the Mississippi River below St. Anthony Falls, Pike regarded the falls as the gateway to the wilderness beyond. On September 27, he penned a letter to his wife and prepared a package for his commander in St. Louis. "This business, closing and sealing," he remarked, "appeared like the last adieu to the civilized world."[58] On April 10, on his return trip, he commented again on this feeling. "How different my sensations now," he confessed, following with a long description about how bleak the expedition's outlook and condition had been when they had passed earlier. They had been tired, cold, sick, and "just upon the borders and the haunts of civilized men, about to launch into an unknown wilderness; . . . "[59] While that wilderness may have been unknown to Pike and the Americans, it would not be for long.

Pike's influence was short lived, as America failed to follow up until after the War of 1812. The growing American presence did disrupt the flow of trade goods to the Native Americans in the MNRRA corridor and throughout the region. As tensions between the United States and Britain mounted, President Thomas Jefferson embargoed all commerce in the fall of 1807. The United States actively tried to stop British traders from delivering goods to and collecting furs from Indians in the western Great Lakes and upper Mississippi River valley. This move forced some British traders to withdraw.[60] As the Americans limited the supply of goods reaching the Dakota and as American traders failed to make up the difference, the Dakota began to suffer. The War of 1812 led to even greater shortages of goods and, according to Anderson, left the Dakota impoverished. Because the English traders had married Dakota women and had had children by them, and because the British made an effort to keep trade open, the Dakota sided with the British during the war. Only with the Treaty of Ghent, in 1815, which ended the war, did the British traders begin to withdraw.[61]

By the end of the British era in 1815, we know much more about the MNRRA corridor. While some aspects of Dakota lifeways had changed little, the Dakota were undergoing an important transition.[62] The Mdewakanton villages still had about 4,000 to 5,000 people–close to the numbers they held 20 years earlier. Important changes had occurred, however. On both his trips to trade with the Dakota on the Minnesota River, Pond commented on the abundance of game along the Mississippi and Minnesota Rivers. He killed deer, buffalo, ducks, geese and other animals with little effort.[63] By the end of the British era, overhunting and the depletion of fur and game animals forced the Mdewakantons to break into smaller groups and to begin thinking about agriculture. As early as 1775, Pond noted, the Dakota living near the mouth of the Minnesota River raised "Plentey of Corn. . . ."[64] At Kaposia, Pike discovered the Mdewakantons living in bark lodges, which Anderson suggests indicated a change in subsistence pattern to rely more on corn and beans. Anderson also argues that "changing economic conditions had broken up the larger villages seen by earlier travelers, and this had affected tribal unity."[65]

Assuming Carver's and Pond's accounts are somewhat true, they capture many of the particulars we know characterized the British period. The Dakota had moved out of their traditional homeland around Mille Lacs Lake. They had settled on the Mississippi in the MNRRA corridor and downstream and up the Minnesota River. The MNRRA corridor had become increasingly important to the Dakota. Carver, Pond, and others found the Mdewakantons and other Dakota bands holding regular councils within the corridor or just up the Minnesota River. And the Kaposia band had established a seasonal village on the Mississippi above the St. Croix's mouth. The area had gained more than seasonal importance to the Kaposia band, as the burial of band members near the village demonstrated.

One of the most obvious changes was the extent to which European and American products had begun replacing native goods. Although the supply was never steady and full, the Dakota grew more dependent upon foreign manufactures. Guns had become essential for successful warfare, and warfare, as a result of the fur trade, was becoming more frequent and deadly. While still an independent people, the Dakota would look more often to outsiders for the tools of their existence, and they would increasingly deplete their natural resources to get them.

The Americans

American explorers and traders dispersed through the upper Mississippi River valley following the Treaty of Ghent in 1815, which codified the American victory. Only eight years after the treaty, the *Virginia*, the first steamboat to navigate the upper Mississippi River, reached the first permanent military post in the area. Steamboats hurried exploration, trade and settlement, and they hurried change for the Dakota and the river. The era of exploration would end and the era of settlement begin during these 25 years, although it would be decades before Americans knew the land as well as the native inhabitants had. As the number of Americans swelled, they would squeeze the Dakota into a smaller and smaller area, forcing more changes in their lifestyle and, before long, forcing them away from the Mississippi River and the MNRRA corridor. As game and fur bearing animals disappeared, upsetting the ecosystems of the river and its watershed, the Dakota would turn to agriculture and annuities from the American government, further undermining their traditional ways.

Following the War of 1812, the American Fur Co., under John Jacob Astor, bought the Northwest Company's posts in the United States and began asserting control over the fur trade. In an attempt to eliminate foreign traders, Astor convinced Congress to pass the Foreign Intercourse Act of 1816, which required foreign traders to become naturalized or leave. The Americans, however, had to enforce the act.[16] Despite the American victory and ignoring the new act, some British traders remained on the upper Mississippi. But this time the Americans had come to stay, and in 1816 they began building forts at Prairie du Chien and Green Bay.

As the Mdewakantons had relied on, fought with, and married English traders, they did not readily accept the Americans. In 1816 Little Crow II (Cetanwakanmani) and Wabasha II traveled to the British post at Drummond Island, near Sault Ste. Marie, to learn how seriously they should take the Americans. The British commander answered: seriously. Little Crow and Wabasha quickly learned what he meant. They returned up the Fox River and down the Wisconsin, entering the Mississippi just below Prairie du Chien. When they tried to pass the frontier hub and camp above with the other Dakota already there, the American commander, Brevet Brigadier General Thomas A. Smith, refused to let them. Smith insisted that the two Mdewakanton leaders first had to renounce the British and recognize the Americans as their new sovereigns. Little Crow and Wabasha conceded, giving up their British flags and medals. But British traders continued to reach the eastern Dakota, and the Americans felt a growing need to drive the British out.[17]

So in 1817, Secretary of War John C. Calhoun sent Stephen H. Long, a Topographical Engineer (a branch of the army that had split temporarily from the Corps of Engineers), to map the upper Mississippi and locate potential military sites *(Figure 6)*. On July 15, 1817, Long reached the mouth of the St. Croix River. His description of the Mississippi beyond this point provides more information about the MNRRA corridor than had been left by the uncounted traders who had been through it so many times. Four miles above the St. Croix's mouth–an area now made wide by the pool behind Lock and Dam 2–Long said was the narrowest place below St. Anthony Falls. As he measured it, the river was only 100 to 120 yards wide. Since Pike had crossed the river nearby in 40 strokes, Long decided to see if he could beat him. Although Pike's bateau may have been

FIGURE 6. Stephen Harriman Long. Artist: Charles Vincent Peale. Independence Hall Collection, Philadelphia.

much more clumsy than Long's six oared skiff. Long needed only 16 strokes." Shortly after passing this narrow gap, Long commented that his party had "Passed the Detour de Pin or Pine Turn of the Mississippi (Pine Bend), which is the most westwardly turn of the river, between St. Louis and the Falls of St. Anthony." It was only nine miles to the Minnesota River overland, he observed, but two days by boat. Delaying him further, Long complained that the twisting river made using their sail nearly impossible. On Long's second expedition up the Mississippi, in 1823, William H. Keating, the expedition's journalist, grumbled that the river up to St. Paul was "crooked and its channel impeded by sandbars; and the current rapid, so that the progress of the boat was slow."

Long provides the first comment on the river's water quality. Long recorded, during his 1817 trip, that "The Mississippi above the St. Croix emphatically deserves the name it has acquired, which originally implies, Clear River. The water is entirely colorless and free from everything that would render it impure, either to the sight or taste. It has a greenish appearance, occasioned by reflections from the bottom, but when taken into a vessel is perfectly clear." While Mississippi more accurately means "great river," Long presents a stream dramatically different from the one choked with pollution and sediment at the end of the century. Like Pike, Long noted the water's reddish appearance below the mouth of the St. Croix.

On July 16, 1817, Long's party passed Kaposia, which held 14 lodges (three more than Pike had counted 12 years earlier), and its nearby burial ground. Demonstrating that the Chippewa had not forced the Mdewakantons out of the St. Croix valley yet, most of Little Crow's people were hunting up that river when Long passed. Given how narrow the river was here, Long noted that the village commanded the river and all who tried to pass. Little Crow's people, he remarked, used their strategic position to exact tolls from traders.

Long also arrived at Carver's Cave that day but was unimpressed. While the cave had once contained Native American etchings and a small lake, Long found that the cave had collapsed in many places and was filling with sand. He records no markings by anyone in his 1817 account. During the 1823 voyage, Keating reports that they found the names of Henry R. Schoolcraft and the party of Lewis Cass, the Michigan Territorial Governor, carved into the sandstone inside. Cass and Schoolcraft had visited the cave in 1820.

Pike was much more impressed with Fountain Cave, which lay some three miles above Carver's Cave and a few miles below the Minnesota River's mouth. Long observed that "The entrance of the Cave is a large windinding (winding) hall, about 150 feet in length 15 feet in width & from 8 to16 in height, finely arched over head & walled on both sides by cliffs of sandstone nearly perpendicular. Next succeeds a narrow passage & difficult of entrance which opens into a most beautiful circular room, finely arched above and about 50 feet in diameter. The cavern then continues a meandering course, expanding occasionally into small rooms of a circular form." Long also recorded that a clear stream flowed through the cave "& cheers the lonesome dark retreat with its enlivening murmurs." Fountain Cave, Long says, had been discovered recently, and the Mdewakantons had learned of it about six years earlier. The cave would become a popular nineteenth-century attraction.[55]

While Long examined the sites acquired by Pike and recommended that the United States build a fort at the confluence of the Minnesota and Mississippi Rivers, he did not try to impress the Dakota with the Americans' growing might in the region. An Indian agent named Benjamin O'Fallon initially assumed this role. In the spring of 1818, O'Fallon took a detachment of 50 U.S. soldiers up the Mississippi River in two armed keelboats. He stopped at the Mississippi Mdewakanton villages and continued 30 miles up the Minnesota to Shakopee's village. This was the largest U.S. expedition into Dakota territory and helped convince the Dakota to abandon any hope the British might return.[56] Little Crow's actions made it clear that the United States still needed to make this point. When O'Fallon arrived at Little Crow's village, the chief was absent, having gone to visit and protect British traders in western Minnesota *(Figure 7)*.[57]

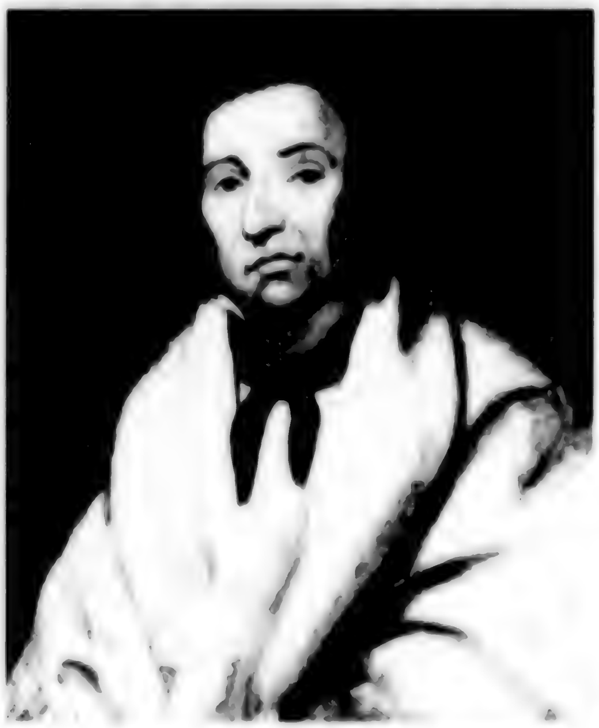


FIGURE 7. Little Crow II, Cetanwakanmani. Artist: Henry Inman. Minnesota Historical Society.

The Americans eliminated any doubts Little Crow had about their permanence the following year. In August 1819, Colonel Henry Leavenworth arrived at the confluence of the Minnesota and Mississippi Rivers to begin building a new fort. Joining him on the trip was the Sac and Fox Indian agent, Thomas Forsyth. At Wabasha's village, and probably at all the Mdewakanton villages, Forsyth laid out the three purposes that the fort would serve for the tribe: it would protect them from the Chippewa and other Indians; it would provide a blacksmith to fix their weapons and tools; and it would be a trade center. The Americans' objectives, which he did not emphasize, were to protect the fur trade from British traders and to control the Native Americans. Contrary to common assumptions, Anderson asserts that Little Crow and other Mdewakantons "viewed the garrison as an asset. . . ." They saw it not as a symbol of American control, which is how the Americans viewed it, but as a demonstration of the Americans' care and concern for the Mdewakantons. Therefore, he surmises, they did not think the fort represented an invasion of their land.[58]

In August 1820 Colonel Josiah Snelling replaced Leavenworth, and on September 10, Snelling set the fort's cornerstone. After visiting the nearly completed fort in 1824, Major General Winfield Scott recommended that the fort's name be changed from Fort St. Anthony to Fort Snelling *(Figure 8)*. The following year, the War Department agreed.[illegible]

Fort Snelling quickly became the regional center for intertribal gatherings and negotiations. In addition to the Dakota, the Chippewa, Menominee, and Winnebago visited the fort. As Forsyth promised, the fort became a trade center, as traders located across the river at Mendota and nearby at Camp Coldwater.[illegible]

FIGURE 8. Fort Snelling about 1848. Artist: Henry Lewis. Minnesota Historical Society.

By the 1820s the Dakota participated in an economic system that would undermine their traditional culture. The more they relied on European and then American trade goods and food, the more they hunted to acquire the furs to trade. By the 1820s beaver were scarce, and the Dakota turned to muskrats. Muskrat skins brought far less than beaver pelts, so the Dakota had to capture many more muskrats. Muskrats totaled three fourths of the furs trapped by the Dakota during the 1820s, and by the mid 1830s, they accounted for some 95 percent.

The destruction of game and fur bearing animals east of the Mississippi and the focus on the muskrat and other small animals for food and furs forced the Mdewakantons to hunt farther west.[61] Keating, in his account of Stephen Long's 1823 expedition, reported that game was rapidly disappearing. He found little game along a 200 mile reach of the Mississippi River below St. Paul. Buffalo no longer drank from or wallowed in the Mississippi. Long had encountered a few buffalo near the Buffalo River (Beef Slough), just below Lake Pepin, during his 1817 expedition.[62] As more American traders moved into Dakota lands, competition among the traders encouraged even greater destruction of fur and game resources.[63]

During the 1820s, forces introduced by the fur trade and the growing American presence began to tear at Dakota community life. More traders and steamboat transportation meant that American and European goods became abundant, replacing ever more native articles. Faced by growing competition, traders relied more on alcohol, and alcoholism became rampant. At Kaposia factionalism intensified. Little Crow, himself prone to excessive drinking, could not hold the village together. Grand Partisan and Medicine

Bottle left to create their own villages after 1825. Grand Partisan established a village at "Pine Turn" or Pine Bend about eight miles south of Kaposia, and Medicine Bottle selected the west end of Grey Cloud Island for his. Even American efforts to stop intertribal warfare, which had been a traditional way for men to gain status, undermined the Dakota way of life.[64]

The depletion of game and the focus on muskrats also brought changes to the Dakota settlement and economic patterns. While the Mdewakantons still hunted along the Chippewa, St. Croix, Sauk and Crow Wing Rivers, they had less and less success each year. At Black Dog's village, just up the Minnesota River from Fort Snelling, the Mdewakantons broke into small groups to hunt muskrats. Small groups worked more efficiently (suggesting a similar pattern for Little Crow's people). By the mid-1830s, Dakota families began leaving their villages on the Mississippi to hunt muskrats on the Minnesota River and its tributaries. Little Crow IV, Taoyateduta, and the man who would assume his grandfather's name and role, even left for the prairies.

By the end of the 1820s and early 1830s, survival for the Mdewakantons who stayed in their villages became difficult. The demise of the region's fur and game resources forced the Dakota, especially the Mdewakantons, to experiment more with agriculture. The small number living around the fort increasingly relied on handouts.[65] William Clark, the superintendent for Indian Affairs, captured the plight of the Dakota hunter well. "'This period,'" he wrote in 1826, "'is that in which he ceases to be a hunter, from the extinction of game, and before he gets the means of living, from the produce of flocks and agriculture.'"[66]

By 1836 the Mdewakantons faced a crisis. Their numbers had fallen to about 1,400, as starvation, a smallpox epidemic, and warfare sapped their population. Thinking he could stop the downward spiral, Lawrence Taliaferro, the Indian agent at Fort Snelling, suggested that the Dakota sell their lands east of the Mississippi River. Although settlers were not pressing for the land, Taliaferro thought the Dakota could benefit far more from its sale than its use. He hoped the money would encourage the Mdewakantons to take up agriculture. Already Little Crow, Black Dog and Cloud Man had asked Taliaferro to help their people learn farming. Cloud Man's people planted crops at Lake Calhoun in 1830, establishing a community named Eatonville, after John Eaton, the Secretary of War. By 1834, 135 Dakota lived at Eatonville. The U.S. government initially balked at Taliaferro's treaty proposal. But when Congress created the Wisconsin Territory in August 1836, the government endorsed the idea.[67]

By the end of September 1837, the treaty's details had been worked out and the Dakota had agreed to them. Under the treaty, the Mdewakantons were to receive $25,000 in food, farm tools, and goods annually for 20 years. They were also to get a permanent $15,000 annual annuity that represented the interest on a $300,000 trust fund. Congress did not officially approve the treaty until June 15, 1838.[68]

The payments from the 1837 treaty gave the Mdewakantons a brief respite. As the annuities provided another food source and as more tribal members received smallpox vaccinations, their population began to recover. On the treaty's eve, the Mdewakanton population had stood at about 1,400. By 1850 it reached 2,250 individuals, a 60-percent surge. (Granted, members returning from the west boosted the band's numbers.) Ironically, Anderson contends, the treaty allowed the Dakota to continue their nomadic lifestyle, by making up for the declining success of the hunt.

The annuities could not hide the demise of the Dakota's game and fur resources. By the late 1830s, muskrat prices had fallen so low in the East that some traders quit taking them. Outside the annuities, muskrats furnished most of the Dakota's income, allowing them to buy food and trade goods. Without muskrats, the Mdewakantons depended more upon the annuities and the Americans. This dependence deepened as game disappeared and pork and flour replaced wild meat and wild rice. And the Dakota, although they had begun experimenting with

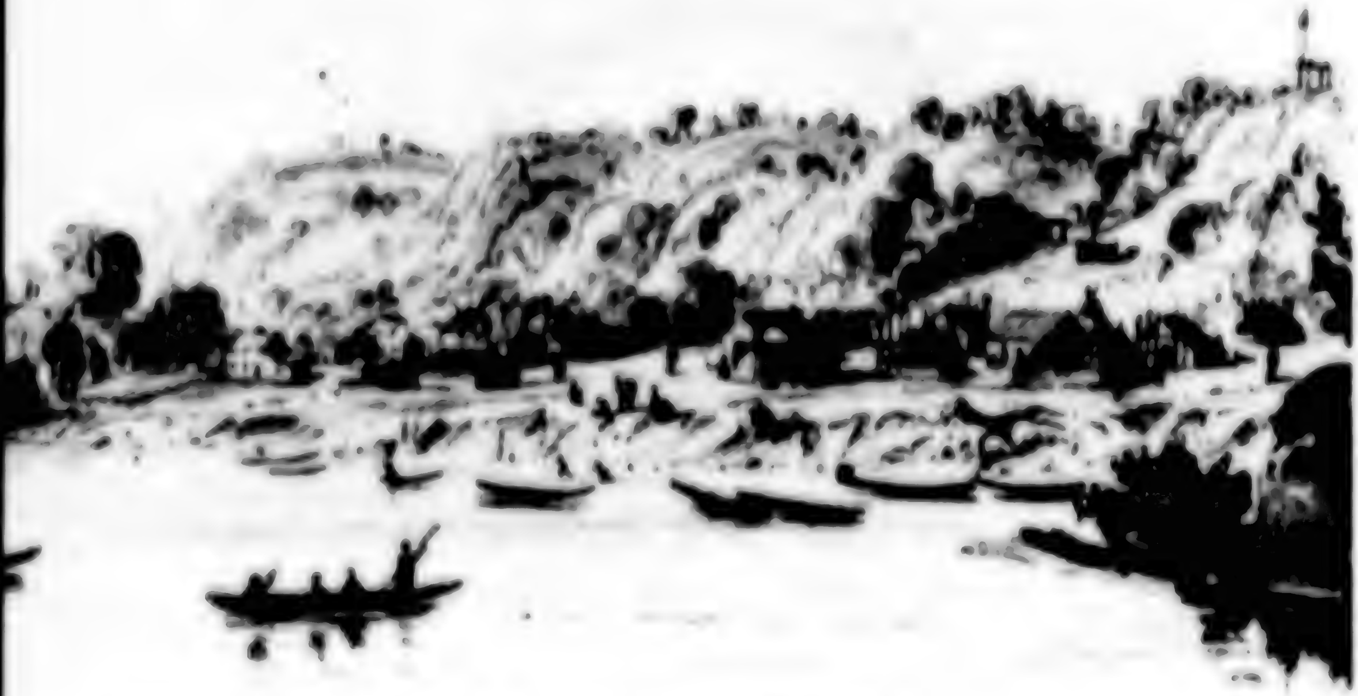


FIGURE 9. *Kaposia II, Little Crow's Village.* Artist: Seth Eastman. Minnesota Historical Society.

agriculture, were far from becoming sedentary.

As the Mdewakantons and other Dakota relied more upon the Americans, the Americans steadily pushed onto the Mdewakanton's lands. By 1838 Little Crow had moved Kaposia across the Mississippi River (*Figure 9*). Almost immediately settlers, including the whiskey seller Pierre "Pig's Eye" Parrant, claimed the land at the old village site. Parrant had built a cabin at Fountain Cave on June 1, 1838, but Fort Snelling's commandant kicked Parrant and others off the military reservation later that year. Parrant then settled at or near the old Kaposia village. Throughout the 1830s and 1840s, the American population east of the river steadily increased, and Methodist missionaries opened a school near Kaposia shortly after the 1837 treaty.

The river was supposed to have been a boundary, but American settlers started crossing over by the hundreds to squat on lands they believed the Federal Government would inevitably open to settlement. Some hoped to capture the waterpower on the west side of St. Anthony Falls (like some entrepreneurs had already done on the east after the 1837 treaty). Others simply wanted to stake their claim to farms, knowing they could get the land as cheap as possible.

Pressure began mounting for the Dakota to sign another treaty, one that would bring an end to their residence along the Mississippi River and lower Minnesota River. This time the Americans would force the treaty on the Dakota. After Wisconsin became a state in 1848 and Congress created the Minnesota Territory in 1849, talk of removing the Dakota intensified. Within a couple of years St. Paul had 142 buildings (*Figure 10*). Pig's Eye, the old

FIGURE 10. St. Paul about 1848. Artist: Henry Lewis. Minnesota Historical Society.

Kaposia village had about a dozen farms, and two frame houses stood at the new Kaposia (*Figure 11*). St. Paul's expansion and the Dakota's growing dependence upon the Americans made another treaty inevitable.

While the western bands, the Sissetons and Wahpetons, wanted a treaty so they could get annuities, the Mdewakantons were not so anxious. The Mdewakantons knew they would be giving up their homeland on the Mississippi and Minnesota rivers. But they, like the other bands, were becoming desperate. On July 18, 1851, the United States, under a commission headed by Alexander Ramsey, the territorial governor, began negotiating with the western, or upper bands, of the Dakota. Despite some ini

tial troubles, the Sissetons and Wahpetons signed the Treaty of Traverse des Sioux on July 23. This put the Wahpekutes and Mdewakantons in the middle of lands ceded to the United States and intensified the pressure on both bands to sign a treaty.

On July 29 the Mdewakantons and the Wahpekutes began negotiating with Governor Ramsey and the U.S. treaty commission, in a warehouse at Mendota. Ramsey addressed the Dakota frankly: "'You would not only have the whites along the river in front but all around you. . . . You should pass away from the river and go farther west.'" Wabasha III and the other chiefs balked. The United States had failed to comply with provisions of the 1837 treaty, and the Dakota insisted these be met before continuing. At Wabasha's (III) request, the council moved outside to Pilot Knob, above the Minnesota River, in full view of the land and rivers that had been so important to them for so long (*Figure 11*). Wabasha then warned everyone that some Mdewakantons had threatened to kill any chief who signed the treaty. Nevertheless, on August 5, Little Crow (IV or Taoyateduta) stood up for the Mdewakantons and signed (*Figure 12*). Thirty five other leaders followed. With this event, Little Crow assumed leadership of the Mdewakantons and acknowledged that his people would have to leave their homeland.

Under the Treaty of Mendota, as it became called, the Mdewakantons and Wahpekutes were to receive a 20 mile wide reservation on the Minnesota River in return for their land. The government also promised goods and services worth $1.41 million. Of this, $1.16 million was to go into a trust fund for 50 years. The government would pay 5 percent ($58,000) of this annually to the bands as food, acculturation projects and cash ($30,000).

The Treaties of Mendota and Traverse des Sioux signaled the explosion of American settlement around the Mississippi River in the Twin Cities metropolitan area. Settlers in the Minnesota Territory celebrated the two treaties. Many hurried west across the river at the news of the Mendota treaty and staked claims to farms and town sites, before the Senate ratified it. The Mdewakantons complained. The government had not made any payments promised by the treaty. The commandant at Fort Snelling referred the matter to Washington and nothing came of it. While the Mdewakantons resented the settlers, they relied on them for handouts, when they returned from their winter hunt.

The Senate finally ratified both treaties but eliminated the provision for permanent reservations. The Dakota then

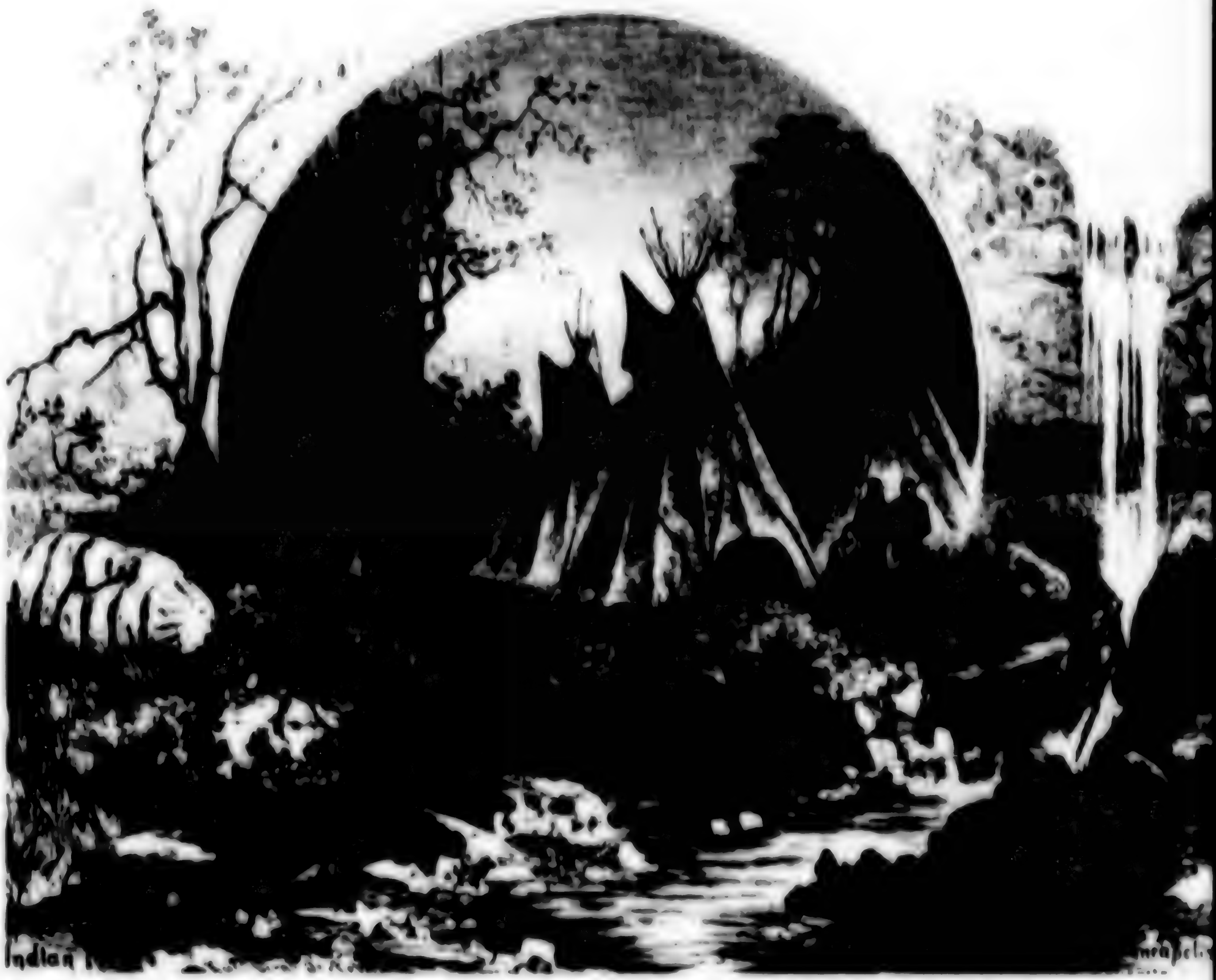


FIGURE 11. This image captures something of what the Mdewakantons gave up in the 1851 Treaty. Red Rock, a Dakota sacred object, sits to the left. An Indian face is painted into the waterfall at Fawn's Leap, a waterfall that lay just below St. Anthony. The face may suggest something about the spiritual importance of waterfalls to the Dakota. Both images attest to depth of Dakota history in the area. Artist: Rudolph Cronau, 1881. Minnesota Historical Society.

questioned whether they should move. While the western bands agreed to the change, the Mdewakantons rejected it. On September 4, 1852, the band finally agreed to the amendments. Henry M. Rice, a St. Paul fur trader hired by Ramsey, apparently assured the Mdewakantons that they would get the reservation on the upper Minnesota River that they wanted.

The task of convincing the Dakota to leave their ancestral homes fell to Willis A. Gorman, who succeeded Alexander Ramsey as Minnesota's territorial governor in 1853. In the spring of 1853, speculators and settlers surveyed Kaposia II for town lots and farms, usurping the Dakota's fields. While Little Crow's people did not overtly resist the intrusions, the Dakota at the villages under Black Dog, Wabasha, and Wakute (Red Wing) did and pressure on the Dakota to leave grew. Little Crow won a short reprieve from Gorman, however. The United States had agreed to prepare the reservation by planting fields and building warehouses, but failed to do so. Little Crow insisted that his people could not survive the winter without provisions and convinced Gorman to let the Mdewakantons stay on the

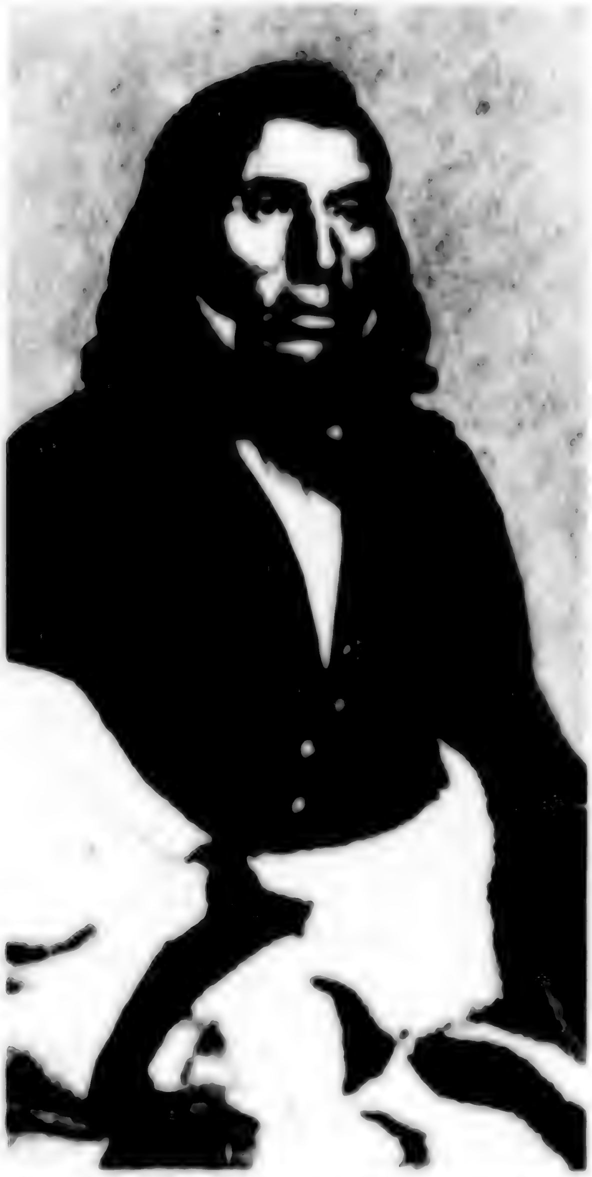


FIGURE 12. Little Crow. Prisoner at Ft. Snelling following the 1862 Dakota Conflict. Photo by J. E. Whitney. Minnesota Historical Society.

Mississippi through the winter of 1853-54.

In the spring of 1854, Gorman took Little Crow to Washington, D.C., and introduced him to the Secretary of the Interior and President Franklin Pierce. Little Crow received enough assurances about the reservation to satisfy him, and he learned how futile resisting would be. In May 1854, Little Crow led his people on an exodus up the Minnesota River to the new reservation near Redwood. By the end of June, most of the Mdewakantons had reached their new home; only a few remained around the Mississippi River.

Removing the Mdewakantons from the Mississippi River and the MNRRA corridor closed an important era in the river's history, in Dakota history, and in the history of American settlement. For hundreds of years, the Dakota had used the river without changing it much, physically or ecologically. But under the fur trade, the Dakota began altering the river's ecosystem, nearly eliminating some species. After the Dakota left, American settlers freely cut down the forests, plowed the ground, and fully harnessed the falls. As more Americans came and the more they relied on the river, the more they would want to change the river and the land to fit their needs. At this point the history of settlement takes over the story in the MNRRA corridor.

Chapter 4

Transforming the River I: Commerce and Navigation Improvements, 1823-1906

The Mississippi River gave birth to most cities along its banks, and those cities did all they could to ensure that the river would nurture their growth. From their pioneer days on, they insisted that the federal government should "improve" the river for navigation. St. Paul and Minneapolis pushed especially hard. Lying at the head of navigation, they demanded a river capable of delivering the immigrants needed to populate the land (not considering that they had taken it from Native Americans) and the tools and provisions needed to fully use it. They also demanded a navigable river so they could deliver the bounty of their labor and their new land to the country and the world. All this, they believed, was part of their manifest destiny. To fulfill that destiny, they would help transform the entire upper Mississippi River and make the reach between Hastings and St. Anthony Falls one of the river's most engineered. *(Figure 1)*

The Twin Cities had to see that the entire Mississippi River was remade. They needed local navigation projects, but these did little good without a navigable river downstream. So they actively participated in local, regional and national campaigns for navigation improvement. In response to their lobbying, Congress authorized four broad projects to improve navigation on the upper river and a number of site specific projects in the Twin Cities metropolitan area since 1866. The four broad projects are known as the 4-, 4½-, 6- and 9-foot channel projects. Key local projects included Locks and Dams 1 (Ford Dam) and 2 (Hastings), Lower and Upper St. Anthony Falls Locks and Dams, and the little known Meeker Island Lock and Dam, which was the river's first and shortest lived lock and dam *(Figure 2)*. In less than 100 years, these projects would radically transform the river that nature had created over millions of years and that Native Americans had hunted along, canoed on, and fished in for thousands of years.

FIGURE 1. Port of St. Paul, head of navigation, 1851. Steamboats at the Upper and Lower Landings. Artist: Thompson Ritchie. American Memory Project, Library of Congress

Navigation on the Natural River: 1823-1866

Early Navigation • Paddling upstream from St. Louis to St. Paul in 1823, the Virginia became the first steamboat to navigate the upper Mississippi River. It did so twice that year. Other boats had been plying the upper river (Indian canoes, piroques, flatboats and keelboats) but the *Virginia* announced a new era. Under steam power, people and goods could be transported upstream far more quickly and in greater numbers and quantities than on boats with sails or oars or poles. As steamboats evolved and as the region's population and production grew, the river's limitations as a

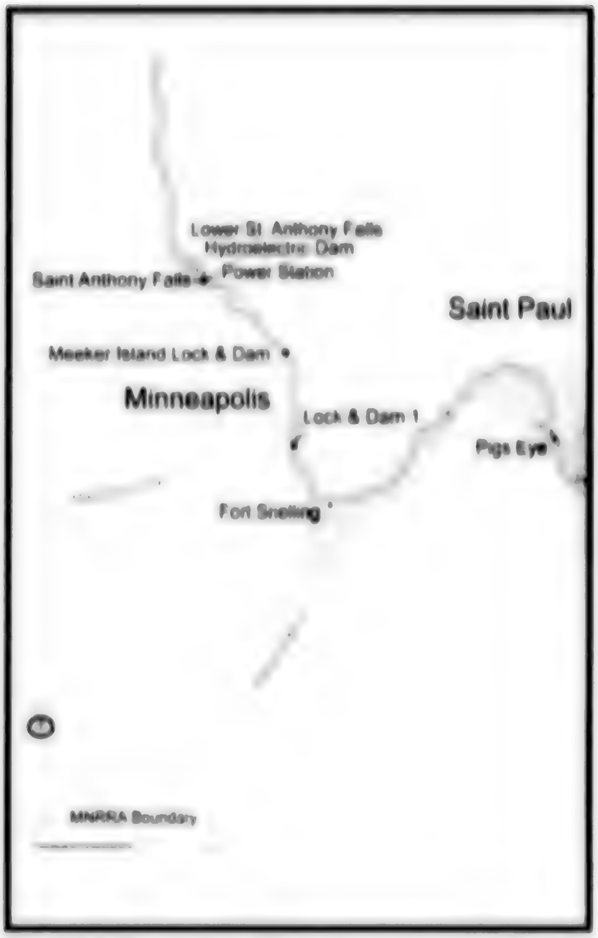


FIGURE 2. To the residents of the growing metropolitan area, the Mississippi promised unlimited wealth if they could harness its power and make it navigable. The early dams, however, served only one purpose.

navigation route would become unacceptable and Midwesterners would repeatedly call for its improvement as a commercial artery.

Steamboat traffic grew quickly after 1823. Between 1823 and 1847, most boats carried lead and worked around Galena, Illinois. Few boats plied the river above Galena. After 1847, as miners depleted the lead supply, the trade quickly declined. Despite the fall of lead shipping, steamboat traffic on the upper Mississippi boomed. One measure of this was the number of times steamboats docked at the upper river's port cities. Some steamboats might land only once, while others returned many times. St. Paul recorded 41 steamboat arrivals in 1844, and 95 in 1849. During the 1850s, traffic soared. By 1857, St. Paul had become a bustling port, with over 1,000 steamboat arrivals each year by some 62 to 99 boats.

Table 5.1
Number of steamboat arrivals at St. Paul, 1844-1862.

1844	41	1854	256
1845	48	1855	560
1846	24	1856	837
1847	47	1857	1,026
1848	63	1858	1,090
1849	95	1859	802
1850	104	1860	776
1851	119	1861	772
1852	171	1862	846
1853	200		

(Sources: Frank Haigh Dixon, *A Traffic History of the Mississippi River System*, Washington: Government Printing Office: 1909, p. 20; Mildred Hartsough, *From Canoe to Steel Barge*, Minneapolis: University of Minnesota Press, 1934, p. 100.)

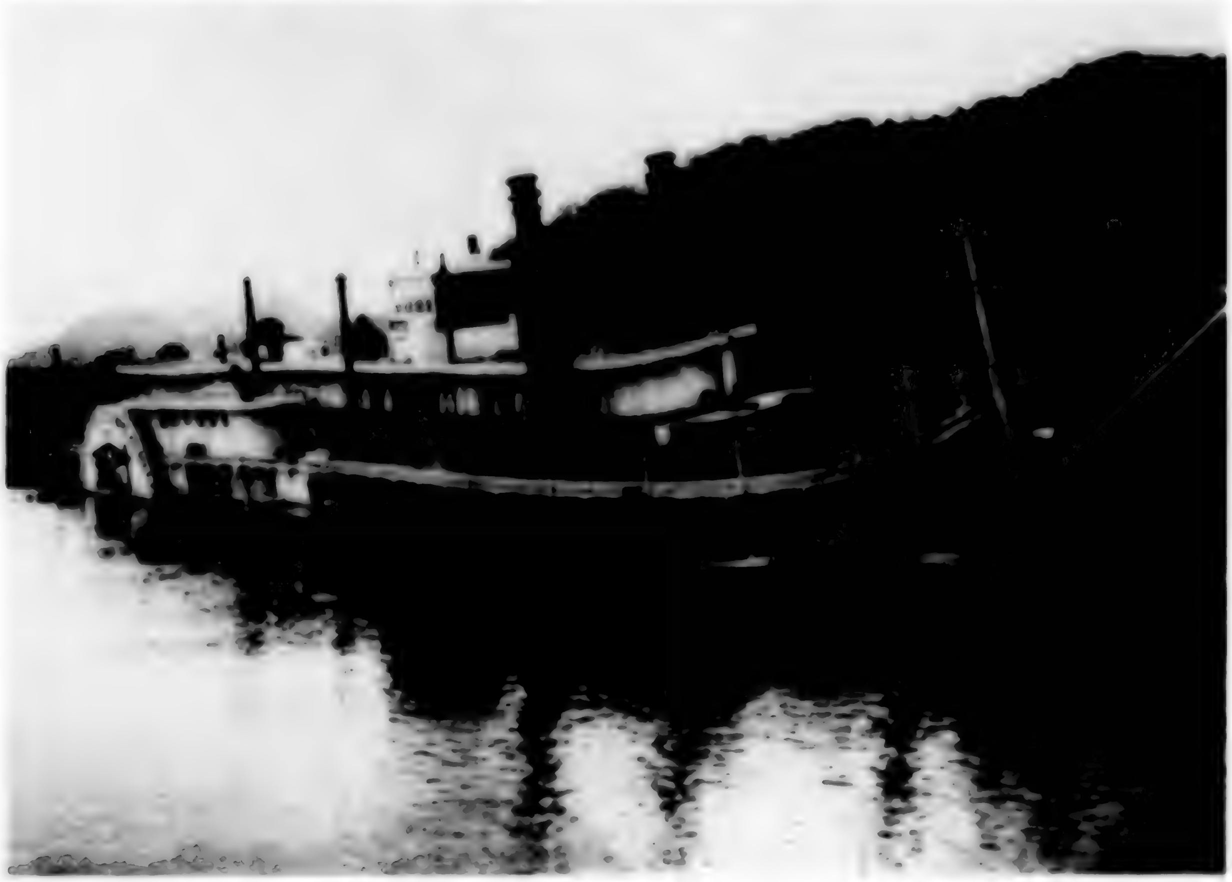
As rapidly as the number of steamboats increased, they could not keep pace with demand. In 1854 the *Minnesota Pioneer*, a St. Paul newspaper, reported that passengers and freight overflowed from every steamboat that arrived and that "the present tonnage on the river is by no means sufficient to handle one half the business of the trade." While two steamboats often left St. Paul each day, they could not carry goods away as quickly as merchants and farmers deposited it, and many upper river cities mirrored St. Paul. Each steamboat that docked created new business and a greater backlog, as more immigrants disembarked to establish farms and businesses.

Spurred by Indian land cessions that opened much of the Midwest between 1820 and 1860, by Iowa's statehood in 1846 and Wisconsin's in 1848 and by the creation of the Minnesota Territory in 1849, passenger traffic on the upper river boomed. Many passengers came from the East; others came from Europe, fleeing famine in Ireland and political unrest on the continent. While some arrived by way of the Great Lakes, many settlers entering Iowa, Minnesota and western Wisconsin made part of their journey on the upper river.[6] Historian Roald Tweet contends that, "The number of immigrants boarding boats at St. Louis and traveling upriver to St. Paul dwarfed the 1849 gold rush to California and Oregon."[7] More than one million passengers arrived at or left from St. Louis in 1855 alone.[8] As a result, the population of the four upper river states above Missouri ballooned between 1850 and 1860. Minnesota's population jumped from 6,077 to 172,023, Iowa's from 192,000 to 674,913, Wisconsin's from 305,391 to 775,881 and Illinois' from 851,470 to 1,711,951.[9] Passenger traffic became so important to the steamboat trade that by 1850 passenger receipts exceeded freight receipts.[10]

The Natural River

Before 1866, during the heyday of steamboats, the upper Mississippi River still possessed most of its natural character. Trees filled and enshrouded it. Where steamboat pilots followed the deepest channel, as it hugged one shore or the other, leaning trees might sweep poorly placed cargo or an unwary passenger from a steamboat's deck. Many trees fell into the water to become snags. Snags skewered the careless and even the cautious steamboat. Snags were such frequent and treacherous hazards that steamboat pilots named them *(Figure 3)*. Those that swayed back and forth with the current they called sawyers. Those that bowed in and out of the water they labeled preachers. Planters were those that became lodged in the river's bottom, and sleepers hid beneath the water's surface. Snags could, in an instant,

FIGURE 3. Wreck of the Quincy, lying on the bottom. Minnesota Historical Society.



impale a steamboat or tear it apart.[11] The natural river became surprisingly narrow in places. Zebulon Pike and Stephen Long both not only commented on how confined the river became above Hastings, they rowed its width to see how few strokes they needed. Pike took 40 strokes in his bateau and Long only 16 in his skiff.[12]

Hundreds of islands, some forming and others being cut away, divided the natural river, dispersing its waters into innumerable side channels and backwaters. By dividing the river, islands limited the water available to the navigation channel and thereby its depth. Islands created dangerous currents.[13] From just below Hastings to St. Anthony Falls roughly 40 islands broke the river's flow. The number of islands, of course, varied with the season and the year, as many islands were temporary.

Sandbars posed the most persistent and frequent problem. They divided the upper Mississippi into a series of deep pools separated by wide shallows that sometimes stranded even the lightest steamboats. Sandbars determined the river's overall navigability. A bad bar could sever St. Paul's and Hastings' connection with St. Louis, the Gulf of Mexico and the world.[14] Normally, during the late summer or early fall, the river began falling and would enter the stage steamboat pilots and Corps engineers called low water. During low water, no continuous channel existed. Deep pools might run near one bank for a short reach and then jump to the other. Or a series of deeper pools separated by shallow sandbars could be scattered across the main channel. Deep was anything over three feet.

Sandbars determined the river's controlling depth–the minimum depth for navigation at low water. From St. Paul to the St. Croix River, the controlling depth at low water was 16 inches. From the St. Croix to the Illinois River it varied from 18 to 24 inches.[15] A few miles below St. Paul, the river sometimes became so shallow that boats would have to stop within sight of the city.[16] The folklore that people once waded across the Mississippi is true.

George Byron Merrick captures well the perils of sailing the natural river. Born in Niles, Michigan, on the St. Joseph River, Merrick watched steamboats go back and forth between South Bend, Indiana, and the town of St. Joseph on Lake Michigan.[17] When Merrick was 12 years old, his family left Michigan and traveled to Rock Island, Illinois. There they took a steamboat upriver to Prescott, Wisconsin, some 30 miles below St. Paul, arriving in June 1854. Merrick's father bought a warehouse on the levee from which he ran a storage and transshipping business. He also sold "boat stores" and groceries to the steamboats that stopped at the levee. The family lived in the upper two stories, George sharing the attic with his brother.[18] From there the boys could see and hear every steamboat that stopped at or passed the levee. "And thus," Merrick recalled, "we grew into the very life of the river as we grew in years."[19] When old enough, Merrick began working on a steamboat as a cabin boy and after one season became a cub engineer. Over the next nine years he worked his way up to become a cub pilot. But in 1862, he left the river to fight in the Civil War. After the war, he settled in New York. In 1876, he returned to Wisconsin to become–fittingly–a railway agent. Subsequently he turned to newspaper editing and publishing.[20]

From his experiences, Merrick learned much about the natural river. Pilots, Merrick recounted, had to study the "nightmares" first. Three of those nightmares–the sandbars at Prescott, Grey Cloud, and Pig's Eye–received special note in Merrick's history. The dangers of navigating the natural river were so great, he said, that pilots had to memorize "every bluff, hill, rock, tree, stump, house, woodpile, and whatever else is to be noted along the banks of the river."[21] And pilots, he added, learned "The artistic quality in handling of a boat under the usual conditions–in making the multitudinous crossings. . . .dodging reefs and hunting the best water."[22] Poor hunters often fell prey to the river they hunted.

In 1862, Nathan Daly, the son of a Minnesota pioneer family fleeing from the Dakota Conflict in Minnesota, recounts the effect bars could have on a steamboat's hull. Traveling down the Mississippi to Illinois, Daly's family camped for a night a few miles below St. Paul. Here, the *Northern Light*, one of the largest steamers on the upper river, passed them just after sundown. The young Daly recalled in his memoir that he could "distinctly hear the grinding of her bottom on the gravel bar over which she was passing."[11] Some boats ground to a halt on sandbars. To get off, pilots sometimes used spars, long wood poles on which the front and back of the boats would be alternately jacked up and pushed forward. In this way, pilots hoped to walk their boat over the bar. If lucky, they avoided "hogging" the boat: that is, warping or breaking its hull.[12]

Rocks and rapids were a greater problem for steamboats trying to ply the river above St. Paul. From St. Anthony Falls to downtown St. Paul, some 15 river miles, the river falls more than 100 feet. This steep slope, combined with a narrow gorge and limestone boulders left by the retreat of the falls, made the river through this reach too treacherous for steamboat navigation.[13] Thus, St. Paul had become the head of navigation.

A Four-Foot Channel, 1866-1877

To steamboat pilots the natural river was too perilous, and Midwesterners feared an unreliable river might limit their region's destiny. That destiny, they believed, was to become a commercial and industrial power as strong as the East, as well as the nation's breadbasket. Before the Civil War, Congress authorized minor improvements for the upper Mississippi River but no work for the river above Hastings.

On June 23, 1866, Congress passed the first postwar River and Harbor Act. This act signaled a new era of internal improvements and the beginning of dramatic changes to the upper Mississippi River. Historians generally agree that with the Civil War's end the federal government took a very different position on internal improvements. Prior to the war, with a few exceptions, Congress and/or the President had opposed a federal role in internal improvements.[14]

The 1866 act provided for the first project to focus on the whole upper river.[15] It directed the Corps to survey the Mississippi River between St. Anthony Falls and the Rock Island Rapids, "with a view to ascertain the feasible means, by economizing the water of the stream, of insuring the passage, at all navigable seasons, of boats drawing four feet of water. . . ." In other words, Congress asked the Corps to determine how to establish a continuous, 4-foot channel for the upper river at low water. Low water was based on the river's elevation in 1864, when a severe drought occurred. By a 4-foot channel, Congress meant a channel at least 4 feet deep if the river fell as low as it did in 1864. (The 9-foot channel today is based on the same benchmark.)

To create a 4-foot channel and deal with the Rock Island and Des Moines Rapids, the Corps established its first offices on the upper Mississippi River: one at St. Paul and one at Keokuk, Iowa (the latter would be moved to Rock Island in 1869).[16] On July 31, 1866, A. A. Humphreys, the Chief of Engineers, ordered Brevet Major General and Major of Engineers Gouverneur K. Warren to St. Paul to begin the Corps' work on the upper Mississippi River *(Figure 4)*. With Warren's arrival in St. Paul in August, the Corps established

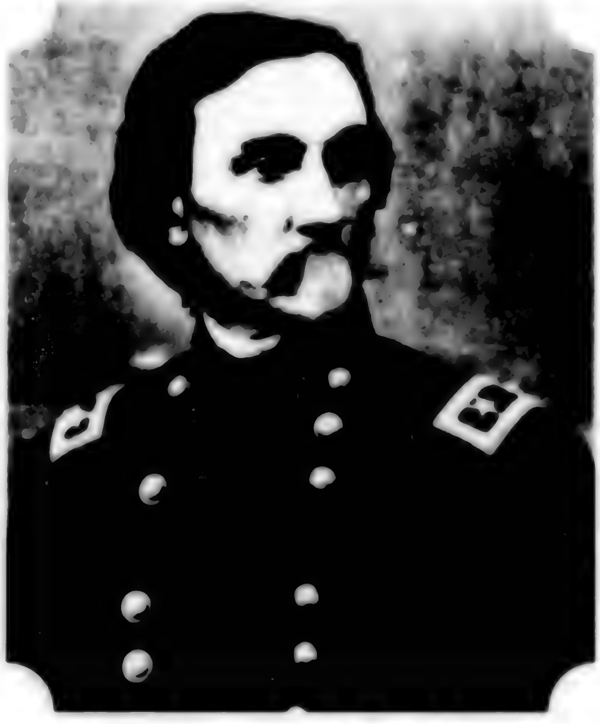


FIGURE 4. Major General Gouverneur K. Warren. First head of St. Paul District, Corps of Engineers. Corps of Engineers.

a permanent stake in how the upper Mississippi River would be managed and changed. From this time forward, the Corps' role in the river would become as deep and broad as the river itself. It came at the insistence of the states, farmers, business interests and the general public. All demanded the federal presence, the federal expertise and the federal dollars.

Before he could develop a plan for achieving the 4-foot channel, Warren had to learn more about the upper Mississippi River and he had to complete his survey. After charging men under him to undertake the tributary surveys, Warren began the upper Mississippi survey from the Rock Island Rapids to Minneapolis himself. From this work, Warren contended that in its natural state the Mississippi River's navigation channel frequently changed and that the Corps would have to survey the river each year until they understood how it worked.[79] In some reaches, Warren reported, sandbars moved in waves along the channel bottom, looking something like snowdrifts. A wave would start at the head of the reach and begin moving down, even when the current slowed. Another wave soon followed. As the river fell, each wave formed a bar that acted like a small dam. Behind the bar lay a deep pool of water. Just past the crest, the channel quickly became deeper.[80] Normally, the river would begin cutting through the steep slope on the back side of the bar and another bar would eventually begin forming downstream of it. Without enough current, this happened too slowly for navigation. When a series of bars came in close succession, the river could become seriously obstructed. In these reaches, Warren found that "the river seems, as it were, lost, and indecisive which way to go and the pilot is scarcely able to find the line of deepest water even in daylight, and is unable to proceed at night with any confidence."[81] The small pools behind the bars would play an important part in Warren's strategy for navigation improvement on the upper river.

Between 1866 and 1869, Warren completed 30 survey maps of the upper Mississippi River, at the scale of 2 inches to the mile. Ten sheets formed a continuous map of the river from St. Anthony Falls to the mouth of the St. Croix River. The remaining maps focused on problem reaches or detailed the river near a specific town.[82] From these maps and from what he would learn about early navigation improvements, Warren began planning the 4-foot channel project.

Warren asked private companies and local interests what work they had done to improve the river's navigability. He learned that Minneapolis and St. Anthony (the community on the river's east bank that merged with Minneapolis in 1872) had funded the removal of boulders to encourage steamboats to travel above St. Paul. At Guttenberg, Iowa, an island split the river into two channels, one passing in front of the city and the other running along the Wisconsin side. Desiring to keep traffic flowing past their city, the citizens had attempted to close the Wisconsin channel but had been unsuccessful. Rafting companies and steamboat interests had employed wing dams to scour the channel at troublesome bars. These "slight dams," Warren commented, had been somewhat successful, "indicating a way of deepening the low water channel worthy of special attention." But these measures had been only temporary; high water usually swept the dams away. Overall, Warren found that those who had been using the river "evince a shrewd knowledge of the action of running water and the means of temporarily controlling it, gained by their constant experience and observation."[83] Warren listened to these knowledgeable sources, but came to his own conclusions.

Warren provided estimates for a variety of projects, in his first annual report in 1867. Responding in part to Minneapolis business and political interests, he requested $235,665 to construct a lock and dam at Meeker Island, which lay between Minneapolis and St. Paul. If built, this project would allow Minneapolis to become the head of navigation. Without a lock and dam, the river above St. Paul was too narrow, too shallow, too strewn with boulders and the current too fast for steamboat navigation.[84] To create a safe and continuous 4-foot channel for the river between St. Paul and the Rock Island Rapids, Warren asked for $96,000 to acquire and operate two dredge and snag boats, $5,000 to construct an experimental closing dam at Prescott Island, about 26 miles below St. Paul, and $5,000 for another experimental closing dam for the Wacouta chute near Red Wing, Minnesota.[15]

Warren decided to deepen the upper Mississippi by dredging. It was a method that had proven successful in France and elsewhere.[16] Mississippi River pilots had learned that by running their paddle wheels over the crest of a bar, they helped the river cut through it, allowing the flow from the pool to deepen the cut just enough for the boat to pass. As a result, Warren favored dredging. As long as the Corps ran the dredges, it could limit the depth of the cut on a bar and preserve much of the deeper pool behind it. "In view of the hold which this method has taken upon the minds of river men, and the difficulties, uncertainty, and expense which attend the use of dams," Warren concluded, "I have determined to recommend the employment of these dredging machines."[17] In 1867 the Corps initiated a program of dredging sandbars, snagging, clearing overhanging trees and removing sunken vessels to create the 4 foot channel.

The 4 foot project did not greatly alter the river's physical or ecological character and did not improve the river much for navigation, but it initiated a series of navigation projects that would do both. The Corps simply did not have the funding, equipment, personnel or authority to make significant and permanent changes. Midwesterners, however, needed to transform the river, if they hoped to make it a commercial thoroughfare.

Demanding a Deeper Channel

Railroad Monopolies • The Midwest's need to receive and send out goods grew as rapidly as its population and agricultural production. Railroads, more than the river, would meet the region's need, but not without a price, a price much too high for some. In 1854 the first two railroads reached the Mississippi River: the Chicago and Rock Island Railroad at Rock Island, Illinois, and the Chicago and Alton at Alton, Illinois. In 1855 a railroad entered Galena. Quincy and Cairo, Illinois, became railheads in 1856, and East St. Louis, Illinois, and Prairie du Chien, Wisconsin, in 1857. La Crosse, Wisconsin, joined these cities, becoming the terminus of the Milwaukee and La Crosse in 1858. At Rock Island in 1856, the Chicago and Rock Island became the first railroad to cross the Mississippi. But the economic panic of 1857 and the Civil War ended further railroad expansion across the Mississippi. Despite the growing menace of the railroads, river traffic remained strong.[18]

Railroad expansion following the Civil War accelerated the pace of the Midwest's unprecedented population and agricultural growth. Railroad trackage in the United States multiplied from 30,635 miles in 1860, to 52,914 in 1870, and 92,296 in 1880.[19] Before the Civil War, only the Rock Island Railroad had bridged the upper Mississippi River from Illinois to Iowa. Between 1866 and 1869, three more railroads crossed the river to Iowa, and by 1877, thirteen railroad bridges spanned the upper river *(Figure 5)*.[20] Railroads greatly increased the country's ability to move commodities, and, yet, railroads would provoke and inflame a shipping crisis. In doing so, they would contribute to the drive for navigation improvement at the same time they were throttling shipping on the river.

While steamboat traffic had remained strong before the Civil War, steamboats had begun losing passengers and grain to railroads. Early railheads on the upper river's east bank fostered steamboat traffic, but they initiated its end as well. With each new rail connection, steamboats made shorter trips between ports. Instead of going to St. Louis or New Orleans, a steamboat from St. Paul might unload at La Crosse or Rock Island or at other railheads, and increasingly, most river commerce became local.[21]

While the river had been hauling grain since the birth of Midwestern agriculture, railroads held too many advantages over the undeveloped waterways. Railroads moved their freight quicker, giving their users greater flexibility in responding to market changes. Rail lines were generally shorter, more direct, and could reach deep into lands served by no navigable rivers. Compatibility between rail lines

FIGURE 5. Chicago, Milwaukee & St. Paul Railroad Bridge, Hastings, Minn., 1885. By Henry P. Bosse. Rock Island District, Corps of Engineers

made transshipment unnecessary. Trains ran when the river was high or low; they ran when the cold of winter froze it; for the most part, they ran throughout the year.[17] Those railroads that ran east to west–most importantly to Chicago–took advantage of complementary markets. Midwestern farmers sent grain to Chicago, and Chicago merchants and eastern manufacturers sent their goods back on the railroads. While railroads could send many cars in both directions with full cargoes, barges delivering their commodities at St. Louis or New Orleans or points in between too often returned empty.[18]

The Granger Movement • As railroads spread throughout the upper Mississippi River valley and the Midwest, they began monopolizing the shipping of bulk commodities, especially grain. With river traffic failing and railroads monopolizing the region's transportation, many farmers and business interests believed they were facing a shipping crisis. In response, farmers in the Midwest and throughout the nation joined the first national farm movement, called the Grange or Patrons of Husbandry. Grangers sought to control railroad rates through state and federal regulation and through improved navigation on the nation's rivers. Formed in 1868 by Oliver Hudson Kelley, a Minnesota farmer who had moved to Washington, D.C., to work as a clerk in the Department of Agriculture, the Grange had established nearly 1,400 chapters in 25 states by 1873 (*Figure 6*).[19] The number of chapters multiplied to more than 10,000 by the end of the year. Over the next year, the

Grange founded nearly 12,000 chapters and claimed over 858,000 members.

Solon J. Buck, who wrote the classic study of the Grange, observed that, although avowedly nonpolitical, "the phenomenal increase in the membership of the order during 1873 and 1874 awakened the liveliest interest, and sometimes apprehension, among politicians throughout the Union." As a result, he says, "the *New York Tribune*, referring to the Grange, declared that 'within a few weeks it has menaced the political equilibrium of the most steadfast states.'" While the Grange refused to form a political party or actively participate in the established parties, its members did not. Farmers created third parties in states throughout the country during the mid 1870s, winning significant elections and threatening the established order.

Kelley and Grangers in the upper Mississippi River valley saw the river as an essential route to domestic and foreign markets. Demonstrating the Grange's early concern for improving the Mississippi River, the state Grange convention of 1869 featured the river. Printed in the *Minnesota Monthly*'s July edition, the convention's preamble to its resolutions declared:

> *The Mississippi River traverses for thousands of miles the noblest agricultural regions of the earth, running from North to South. . . . It is destined to become the most populous region of the world, and its waters should forever be kept free and untrammelled and open to the use of every citizen within the entire navigable length, and all obstructions, whether natural or of human device, are like impediments to the prosperity of the people who till the soil of the great valley.*

In August 1870 Kelley left Minnesota by steamboat for St. Louis to secure direct trade arrangements between Minnesota and Missouri. During his trip he fed the *St. Paul Pioneer Press* articles condemning railroads and the Chicago Board of Trade and promoting waterway improvement. He hoped to restore the dying river connection between St. Paul and St. Louis. "The Mississippi and her tributaries are natural outlets for the west and northwest," Kelley insisted, "but how little attention is given to their improvement." Railroads, he charged, "control the river front in every town on the river; their boats can land freight without paying wharfage and people consider it all right." While railroads had received huge land grants, steamboats had not. "Railroads have got enough for the present . . . ," he concluded, calling on Congress to appropriate funding "for every navigable stream in the West" and to "open the natural outlets free to all." To restore river traffic, Kelley insisted that the Mississippi needed grants like those given to railroads and the Grange had to establish an agent in St. Louis to buy and sell Minnesota's products.

As with the drive for railroad legislation, the push for waterway improvement was not just a farmers' movement. St. Louis merchants were among the Mississippi River's

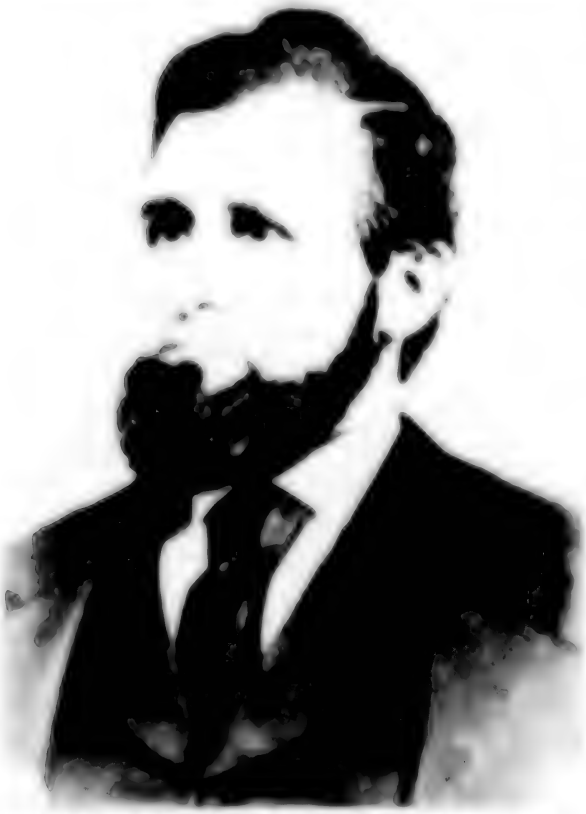


FIGURE 6. Oliver Kelley, founding member, Patrons of Husbandry or the Grange. (Minnesota Historical Society)

greatest advocates. Reeling from C[illegible] increasing dominance over the region's trade, they saw the river as their best counteroffensive. In 1867, they held, according to one historian, the most important navigation improvement convention before 1873. "The keynote of the meeting was a determined effort to obtain federal money for the improvement of western waterways so that they might be used as reliable routes for cheap transportation." Cheap transportation, delegates argued, would allow the United States to "monopolize the markets of the world."

In May 1873, cheap transportation advocates held another convention in St. Louis–the Western Congressional Convention. It drew national Senators and Representatives from 22 states and the governors of Minnesota, Ohio, Kansas, Missouri, and Virginia. The conference organizers' goal was to impress upon these key political officials the depth of the shipping crisis. The solution, they insisted, lay in improving the nation's waterways, especially the Mississippi River and [illegible]butaries. Such improvements were beyond the abilit[illegible] the individual states and had to be undertaken by the [illegible]ral government, they declared.

The Windom Committee • Spurred by the Granger movement and navigation conventions–partly out of fear and partly out of a genuine concern to help farmers and businesses–Minnesota Senator William Windom asked the Senate to establish a committee to examine the transportation problem and recommend solutions to it. The threat of a railroad monopoly, the commercial decline of the Mississippi River and rising dissatisfaction with his Republican party were of particular concern to Senator Windom (*Figure 7*). Windom's hometown, Winona, lay on the Mississippi River in southeastern Minnesota. Windom first became a senator when Republican Daniel S. Norton died in office in 1870 and Minnesota's governor appointed Windom to fill the seat. Windom had already served in the House for a decade. While the Minnesota legislature appointed someone else to finish Norton's term, Windom won the seat in 1871. He would become one of the Senate's strongest advocates for railroad regulation and navigation improvement.

FIGURE 7. Navigation booster and Minnesota Senator William Windom. Photo by Brady. Minnesota Historical Society.

The rapidly growing strength of the Granger movement in Minnesota and the threat of railroad monopolies spurred Windom to address the transportation issue with zeal. Led by Ignatius Donnelly, Grange supporters had organized the People's Anti-Monopoly party "with a platform striking at monopolies, advocating state railroad controls, and denouncing postwar corruption." Recognizing the Granger movement's growing strength and its discontent with the Republican party's failure to deal with monopolies and the farm crisis, Donnelly joined the movement in 1873. As Anti-Monopoly parties threatened to undermine the Republican party's dominance in the state and nationally, Windom and other Republicans began working for railroad reform and began seeking ways to solve the farm crisis.

As chairman of the Senate Select Committee on Transportation to the Seaboard, Windom was in an especially good position to help both farmers and his party. In December 1872, he had introduced a resolution to address the transportation problem. And in a speech before the Senate, he asserted that "it was 'an admitted fact' that present transportation facilities between the interior and the seaboard were 'totally inadequate.' These transportation networks," he charged, "were controlled by 'powerful monopolies who dictate their own terms to the people. The burdens they impose upon both consumer and producer are too grievous to be long endured.'" On March 26, 1873, responding to Windom, the Grange and the transportation crisis, the Senate directed Windom's committee to study the problem.

On April 24, 1874, Windom's committee submitted its report to the Senate. After reviewing various proposals, the committee recommended that Congress regulate some railroad operations and that it authorize an intense program of waterway improvements. The "remarkable physical adaptation of our country for cheap and ample water communications," the committee concluded, "point unerringly to the improvement of our great natural water-ways, and their connection by canals, or by short freight railway portages under control of the government, as the obvious and certain solution of the problem of cheap transportation."

Relying on the reports the Corps of Engineers submitted, the committee noted that improvements on the Mississippi River had been sporadic. No general plan had been developed or implemented. The committee recommended that Congress authorize surveys and get cost estimates prepared as early as possible "in order to mature a plan for the radical improvement of the river, and of all its navigable tributaries." The committee suggested that the Corps establish a channel of 4½ to 6 feet for the upper Mississippi River. To create a channel of these depths, the committee acknowledged, would require constricting the river with wing dams and closing dams.

Together, the Grange, shippers and merchants, boosters in river towns and the Windom committee persuaded Congress to authorize the 4½-foot channel project. The works built under the 4½-foot channel project embody these national movements and local efforts.

The Four and One Half Foot Channel, 1878-1906

By authorizing the 4½-foot channel project, Congress directed the Corps to remake the upper Mississippi. The Engineers were to create a permanent, continuous navigation channel, 4½ feet deep at low water, for the entire river between St. Paul and the mouth of the Illinois River at Alton. To do this, they would have to change the Mississippi's landscape and environment. They would have to eliminate the wide shallows and sandbars and the thousands of little pools that Warren had once sought to preserve. They would have to alter the pattern by which sand and silt moved along the river bottom. They would have to focus the river's current into one main channel and block off the myriad side channels. The focus of Corps work between 1878 and 1906, the 4½-foot channel became the first system-wide, intensive navigation improvement project for the upper Mississippi River. It would alter the navigable portion of the river through the MNRRA corridor dramatically.

The Corps had experimented with channel constriction in 1874. As it had learned more about the upper Mississippi River, the Corps had recognized the futility of keeping the river navigable by dredging. In 1874, when the *Montana* could not dredge due to high water, the Engineers refitted it with a pile driver and went to Pig's Eye Island, five miles below St. Paul (*Figure 8*). The island divided the river, and the navigation channel sometimes ran on the east side and sometimes on the west. Below the island no deep channel existed at low water. To eliminate the problem, the Engineers closed the upper end of the east channel. They did so by driving two tiers of piles nine feet apart and then filling between them with willow brush and placing

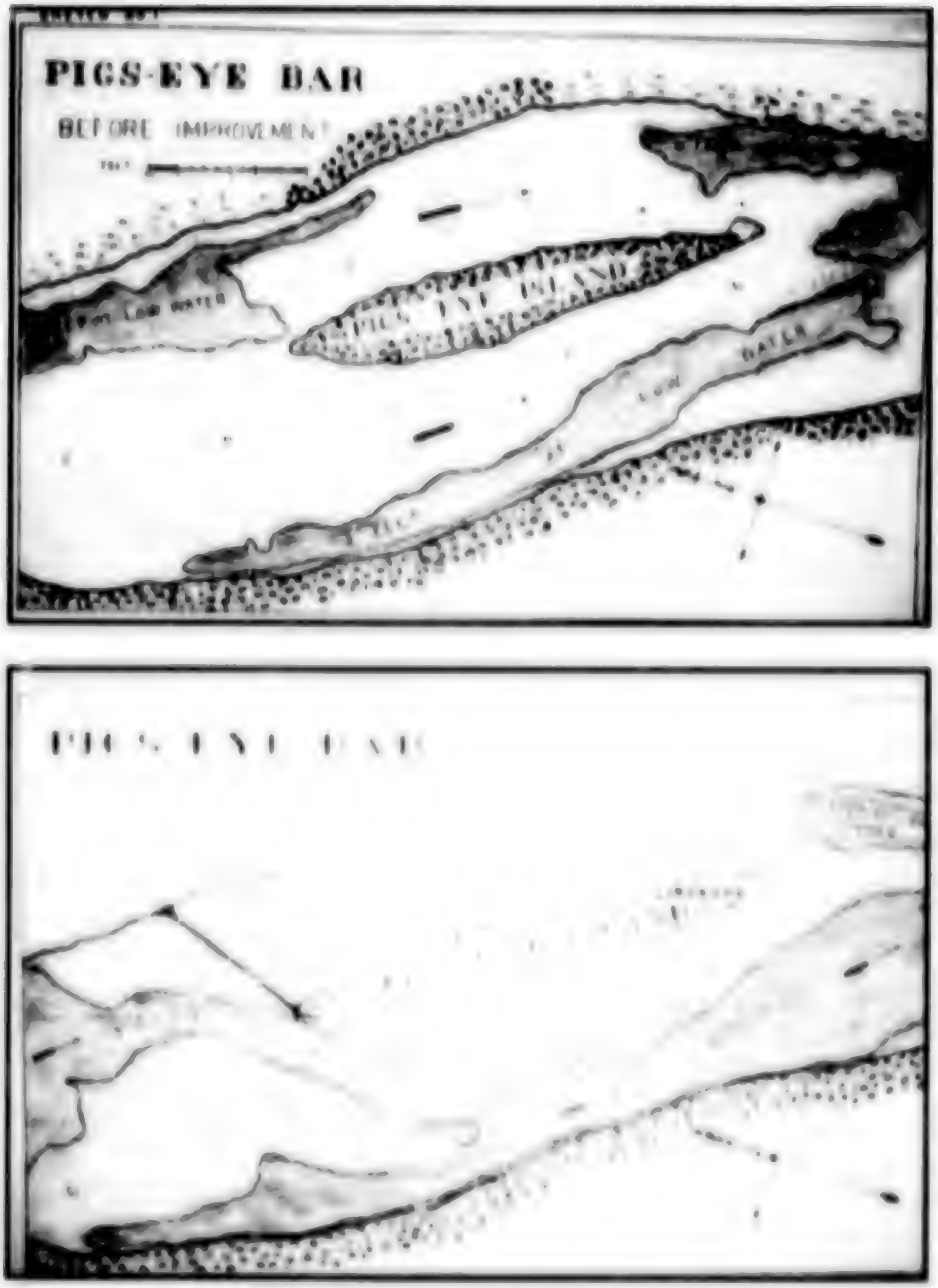


FIGURE 8. Pigs Eye Island before and after closing dam construction. Corps of Engineers.

sacks of sand on top to weigh the brush down. Overall the dam was 600 feet long and six to ten feet deep. From this experimental dam, channel constriction would grow into a comprehensive and expansive project that would reconfigure the upper river's landscape and ecology.

To achieve the [illegible]-foot channel, the Corps had to expand upon the channel constriction experiments. By narrowing the river and thereby increasing the main channel's velocity, the Corps hoped to scour one uninterrupted navigation channel the length of the upper river. Wing dams, closing dams and shore protection required two simple components: willow saplings and rock. The Engineers or their contractors placed the rock and brush in layers until a dam rose above the water surface to a level that would guarantee a minimum [illegible]-foot channel (figure 9).

Alberta Kirchner Hill spent 19 summers ([illegible]) with her father's fleet as they built the dams for the government. Her father, Albert Kirchner, along with Jacob Richtman, both from Fountain City, Wisconsin, became the leading contractors for the Corps in wing dam construction. From the building boat, Alberta Kirchner recalled, "... I could even smell the delightfully blended odor of the willows and of the creosoted marline twine with which the bundles were held together. It came to me strongly every time the men hoisted a swishing bundle of brush to their gunny sack protected shoulders. . . ." Once the willow mats had been laid in the water, the workers would sink them with rock. "No sooner had a barge of rocks been pulled up to the dam," Hill remembered, "than the symmetry of the load was destroyed as the men began the routine of sinking the mat . . . From the quarterboats you could hear the big rocks hitting each other, like a rapid fire rage . . . as the mat went down under the load . . . a splashing began. The sound grew in intensity as the mat sank lower and lower in the water."

The wing dams' success depended upon the main channel's volume and velocity. During the late summer or early fall, when the Mississippi usually became a shallow, slow moving stream, the wing dams could not direct enough water down the channel to scour it. Droughts had the same effect, but could last an entire season. The many islands dividing the river disbursed the little water available into side channels and sloughs. As the experiments with closing dams had shown, cutting off the side channels greatly increased the main channel's flow. The river passed over the closing dams when high, but for most of the year, the dams directed water into the main channel, denying flow to the river's side channels and backwaters *(Figure 10)*.

While the river naturally eroded its banks, closing dams and wing dams accelerated erosion by increasing the channel's velocity and volume. Wing dams especially caused bank erosion by forcing the river away from one shore and against the other. At Dibble's Point, the shoreline had eroded 15 to 20 feet in one year due to a wing dam built at Prescott Island, near Prescott. To protect shores from naturally eroding or from being undercut by the con

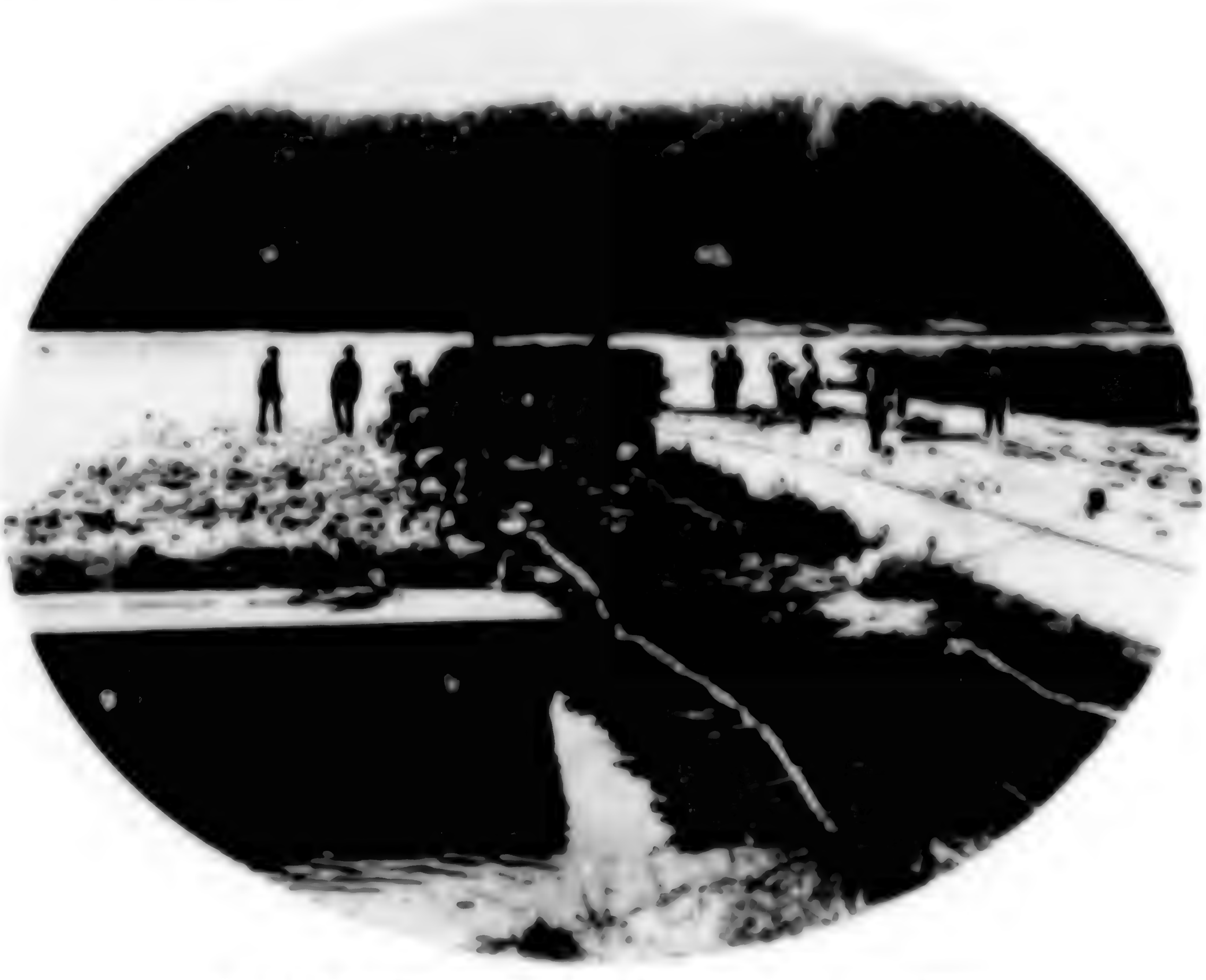


FIGURE 9. Wing dam construction. Photo by Henry P. Bosse. St. Paul District, Corps of Engineers.

FIGURE 19. Channel constriction at Pine Bend, Minnesota, 1891. Photo by Henry P. Bosse. St. Paul District, Corps of Engineers.

stricted channel, the Corps protected hundreds of miles of shoreline with brush mats and rock.

A 1903-1905 Corps navigation map shows the river ribbed with wing dams and closing dams and lined with hundreds of miles of riprap. Wing and closing dam construction began at Pike Island at the mouth of the Minnesota River. By 1905, the Engineers had built about 140 wing and closing dams from the Minnesota River to the southern end of the MNRRA corridor below Hastings. They had closed nearly all the side channels.

The Engineers did not build all the works depicted in one area at the same time. They would build as many wing dams, close as many side channels, and protect as much shoreline as needed to establish a 4½-foot channel. Then they would move to the next troublesome reach. In newly constricted reaches, the channel might be good for a season or two and then become difficult again, due to the river's natural tendencies or as a result of the improvement works themselves. Where necessary, the Engineers would return and add more wing dams, closing dams and shore protection. The density of channel constriction works and the degree to which they physically and ecologically changed the river increased gradually over the project's history.

Dams at the Headwaters

The desire to improve navigation on the upper river affected the river above the Twin Cities, as well. To further increase the water available for navigation, Congress authorized the Corps to construct six dams at the headwaters of the Mississippi, in northern Minnesota, between 1880 and 1907. Warren had recommended that Congress fund a survey of the upper Mississippi River's headwaters and tributaries in his 1869 report. In his next report, Warren had suggested a system of 41 reservoirs for the St. Croix, Chippewa, Wisconsin and Mississippi River basins. Subsequent engineers reduced this number to six.

Millers at St. Anthony Falls especially pushed for reservoirs above the falls. William Washburn went so far as to purchase land at one of the reservoir sites in anticipation of a private or federal project there and later gave the land to the government. The millers recognized that the release of water from the reservoirs for navigation in the later summer and fall would increase the flow of water to keep their mills turning longer and more consistently.

Congress initially balked at the project's pork barrel appearance. In 1880, however, it finally authorized an experimental dam for Lake Winnibigoshish and authorized the remaining dams shortly afterwards. The Headwaters project provided for construction of the Winnibigoshish Dam in 1883-1884 and the completion of dams at Leech Lake (1884), Pokegama Falls (1884), Pine River (1886), Sandy Lake (1895), and Gull Lake (1912). In their 1895 Annual Report, the Engineers reported that releasing water from the Headwaters reservoirs had successfully raised the water level in the Twin Cities by 12 to 18 inches, helping navigation interests and the millers. Twenty-seven river miles downstream, at Hastings, they recorded a rise of about one foot and at Red Wing about one half foot. To steamboats, even half a foot was important. Below Red Wing water from the reservoirs had little effect.

The Meeker Island Lock and Dam

From Minneapolis' perspective, the channel improvement works on the upper Mississippi River only benefitted its principal rival—St. Paul—until Congress did something about the rapids below St. Anthony Falls. Millers at St. Anthony were profiting from the release of water from the Headwaters Reservoirs, but Minneapolis civic and commercial boosters wanted more than milling. They yearned to make their city the head of navigation. So, commercial leaders in Minneapolis, supported by the State of Minnesota, sought federal support for navigation improvements in 1866. Their effort resulted in one of the most mysterious and ill-fated projects on the upper river. One dam would be blown up within 5 years of its completion and another would have to be redesigned and the completed part rebuilt. The project would permanently reshape the river between Lock and Dam 1 (the Ford Dam) and St. Anthony Falls. It is a story with local and national significance.

As early as 1850, Minneapolis business and civic leaders had tried to convince shippers that steamboats could reach the falls. To prove their point, they paid the steamer *Lamartine* $200 to journey from St. Paul to the cataract. They also raised funds during the 1850s to remove boulders and other obstacles. Recognizing that the river's challenges required more than these futile measures, navigation boosters began discussing a lock and dam for the river above St. Paul as early as 1852. Over the next five years, the city's newspapers, civic leaders and the Territorial Legislature called for locks and dams to carry the booming steamboat trade to Minneapolis. In 1855, the St. Anthony Express proposed building two locks and dams. In 1858, when Minnesota became a state, the new legislature sent a petition to Congress requesting that the federal government improve the river for navigation above St. Paul.

While Minneapolis navigation boosters focused on shipping, others recognized the river's hydropower potential between the falls and St. Paul. Bradley B. Meeker and Dorilus Morrison formed the Mississippi River Improvement and Manufacturing Company in 1857, with a group of Minneapolis businessmen, to develop this potential. Playing on the desire of Minneapolis navigation boosters, they proposed building a lock and dam between the two cities to aid navigation and to secure the hydropower for themselves.

Meeker, a territorial judge and local entrepreneur, and Morrison, a St. Anthony Falls sawmill operator, lobbied for and obtained permission from the Minnesota Territorial Legislature to build their lock and dam near Meeker Island. Gone now, the island lay some three miles below the falls in Minneapolis. Portending the coming conflict with Minneapolis, St. Paul citizens criticized the project, as it would steal from them their valuable position as the head of navigation. As with so many projects, the Economic Panic of 1857 and the Civil War stalled the Mississippi River Improvement and Manufacturing Company's plans, postponing the project and the intercity conflict.

Holding to their dream through the depression and the war, Meeker and Morrison beseeched Congress for a land grant to fund their project in 1865. Focusing on navigation, the Minnesota Legislature, in 1866, petitioned Congress to authorize navigation improvements above St. Paul and requested the land grant on behalf of Meeker's company. The company needed the grant, the state contended, because the company's income from water power would be limited by the "inexhaustible resources in this respect above and on the falls" and because the company's state charter required it "to lock boats through free." Anticipating opposition from the millers at St. Anthony, the state claimed that the petition's principal purpose was to bring steamboats to Minneapolis and that hydropower was "incidental." Meeker, himself, emphasized navigation. The miller's "fear," he said, "is another waterpower that might result incidentally from our effort to get Boats to the Falls of St. Anthony."

Minneapolis navigation boosters clearly saw that Meeker's project would extend navigation above St. Paul which was their primary reason for supporting it. In its petition, the state stressed that boats had frequently landed within two and one half miles of downtown Minneapolis, up until 1857. But, as a result of the economic panic beginning that year, a number of unprecedented droughts and the Civil War, navigation, they brashly claimed, "had receded some sixteen miles, to St. Paul, where all the freight destined to these cities, (Minneapolis and St. Anthony) and the vast regions north and west . . . must break bulk and be carried in wagons to their destination." A lock and dam, the state contended, would extend navigation "to its natural and proper terminus."

Acknowledging the obvious local appearance of its request, the state touted the project's interregional benefits. The best market for the Midwest's corn, flour, pork, and beef, it claimed, was the South. And the Midwest needed the South's cotton, rice, sugar, and molasses. Whatever products the Midwest came to manufacture, like woolen and cotton fabrics, would find their chief market in the South and Southwest. The Mississippi River, the state insisted, provided the natural link. Echoing the beliefs of their counterparts downstream, Minneapolis boosters pointed to the divine purpose of their project. "Direct communication," they pleaded, "is both natural and necessary, and the all beneficent Creator has graciously anticipated the wants and necessities of unborn millions in having given us exactly such a continuous means of supply and exchange from the Falls of St. Anthony to the Gulf of Mexico." The petition even cited editorials from the St. Paul papers stressing the importance of Minneapolis to the region's economy.

Finally, and recognizing the emerging power of railroads, the state asserted that the river "is now and ever will be and remain the great regulator and moderator of fares and freights among the rival carriers of the commerce of the west." Referring to the Civil War, the state implored Congress to "recollect with what haste and facility the various railroad lines combined to increase the cost of travel and double, and in some instances triple and quadruple, the cost of transporting the produce of the west during the late non intercourse measures in the Lower Mississippi." The river would bind the country together again.

Navigation boosters in Minneapolis failed, however, to convince Congress of the importance of their project. Congress rejected Meeker's request and the Minnesota Legislature's petition for a land grant in support of a lock and dam in 1866. It did, however, authorize the Corps of Engineers to survey the reach between Fort Snelling and St. Anthony Falls, along with its general survey of the upper Mississippi River.

Warren brought new hope for the project, when, in his 1867 annual report, he requested $235,665 to construct a lock and dam at Meeker Island. Warren engaged Franklin Cook, a former employee of the Minneapolis Mill Company, to undertake the survey. Cadwallader C. Washburn and his brother William D., the Minneapolis Mill Company's owners and two of the city's most powerful and prominent millers, adamantly opposed locks and dams. As Cook had worked for the Washburns, Meeker expected a negative report. Cook completed his survey between 1866 and 1867 and, to Meeker's surprise, recommended that a lock and dam be constructed at Meeker Island, with a 13-foot lift. Cook's report and lobbying by Representative Donnelly and Senator Alexander Ramsey finally convinced Congress to give the State of Minnesota a 200,000-acre land grant to finance the dam, rather than having the Corps build it.

On June 7, 1868, the *Minneapolis Daily Tribune* claimed that the Meeker Island lock and dam would "transfer the commercial prestige of this upper country from St. Paul to the 'Magnet.'" St. Paul industrial boosters also claimed victory. A day earlier, the *St. Paul Daily Dispatch* had declared that the dam had given St. Paul "a water power equal to St. Anthony," and would provide enough power "to make St. Paul one of the largest manufacturing cities on the continent." Through a deal between Meeker and a number of St. Paul businessmen, St. Paulites had gained control of Meeker's company and would get the waterpower created by the dam, even if Minneapolis and the state thought it overshadowed by St. Anthony Falls.

On March 6, 1869, the state awarded the land grant to the Mississippi River Improvement and Manufacturing Company. It required the company to spend $25,000 on the project before February 1, 1871. If the company failed to do so, the state threatened to rescind the grant and issue it to another company. Having accomplished nothing as the deadline approached, the company spent $26,000 during late 1870 and early 1871. It did not begin building the project, focusing instead on a provision in the grant that limited the company to selling no more than one section of land within a township. As this requirement had proven cumbersome, the company asked Congress to modify it to allow for the sale of more sections within a single township. To secure their objective, the company needed support from businessmen in Minneapolis, and for that support, Minneapolis interests won back control of the company. At this point, Minneapolitans began fighting among themselves over the project.

Millers feared a competing water power so close to St. Anthony Falls and believed that the project might jeopardize federal funding for repair work at the falls. Due to the milling operations at the falls, the cataract was in danger of deteriorating into a series of rapids. Sawmill owners also feared that they would not be able to continue dumping sawdust into the river, as it would obstruct navigation, and boom company operators did not want a dam obstructing the lumber rafts they sent downriver. Some opponents argued that it was the federal government's responsibility to improve the river, not private interests subsidized by the government. During its 1872 to 1873 session, Congress temporarily ended debate over the project, when it refused to amend the land grant.

In 1873, Congress lost patience with the Mississippi River Improvement and Manufacturing Company and appropriated $25,000 for the Corps to begin the project. But Congress required the state to return the land grant before the Corps could start. Eager to begin the project, Major Francis Farquhar, the new St. Paul District commander, reported that he had initiated a survey of the river and of the dam site. Over the next year, he began developing plans, determining that the Engineers could build one lock and dam with a 17 foot lift. Further work on the project, he declared, had to wait until the Engineers could take borings, which they could not do until the state returned the grant. As the state failed to return it, the Corps did not begin work. Nevertheless, Farquhar optimistically asked for $300,000 for the fiscal year ending June 30, 1876. Disagreement over the grant and haggling over land for the project, including the purchase of Meeker Island, however, would delay the project for nearly 20 more years. St. Paul remained the head of navigation, and the Corps focused its efforts downstream.

The lock and dam project hopelessly mired, the Corps, during its 1890 survey, evaluated removing boulders and rocks to encourage navigation. Major Alexander Mackenzie, the Rock Island District commander who had taken over this part of the river with the change in funding in 1888, suspected that Congress might authorize the Corps to remove the boulders in lieu of building locks and dams, even though it had authorized $25,000 to plan for a lock and dam in 1873. He questioned the value of removing boulders, believing that the steep grade and rapid current required locks and dams. As Mackenzie anticipated, Congress, under pressure from Minneapolis to do something, provided $50,000 to the Corps to remove boulders, which the Engineers did during the summer of 1890 and in 1891. In 1892, Mackenzie again insisted that only locks and dams could regularly entice steamboats above Meeker Island; any other efforts, he charged, wasted time and money.

Signaling a possible break, the Chief of Engineers, on February 15, 1893, directed Mackenzie "to prepare new and exact estimates for locks and dams for this portion of the river . . . ." Mackenzie made the surveys, including borings, during the low water season of 1893 and concluded that the Corps would have to build two locks and dams to bring navigation to the old steamboat landing below the Washington Avenue Bridge. Lock and Dam 1 would have to be placed above Minnehaha Creek and have a lift of 13.3 feet. Lock and Dam 2, the Meeker Island Lock and Dam could then be placed about 2.9 miles upstream, below Meeker Island, and would have a lift of 13.8 feet. Mackenzie added that the Corps would have to build a third lock and dam with a 10.1 foot lift to bring navigation to St. Anthony Falls and a fourth lock to bring navigation above it. He estimated that Lock and Dam 1 would cost $568,222 and that Lock and Dam 2 would cost $598,235. Extending navigation above St. Anthony Falls with the other two locks and dams would total $1,538,702.

Accepting Mackenzie's arguments and under continual pressure by navigation proponents in Minneapolis, Congress authorized the "Five Foot Project in Aid of Navigation," in the River and Harbor Act of August 18, 1894. In this act, Congress directed the Corps to extend navigation to the Washington Avenue Bridge by constructing Lock and Dam 2. While it did not mention Lock and Dam 1, Congress called for improving the river from near the mouth of the Minnesota River to the Washington Avenue Bridge, indicating that another lock and dam would be built below Meeker Island. Following through on the 1894 act, Congress provided for the construction of Lock and Dam 1 in the River and Harbor Act of March 3, 1899. By the fall of 1906 the Engineers had completed most of Lock and Dam 2, and on May 19, 1907, the *Itura* became the first steamboat to pass through the lock (*Figure 11*). At Lock and Dam 1, the Engineers had begun constructing the lock. Few, if any, spectators watching the *Itura* paddle through Lock 2 imagined that the new facility would be destroyed within 5 years.

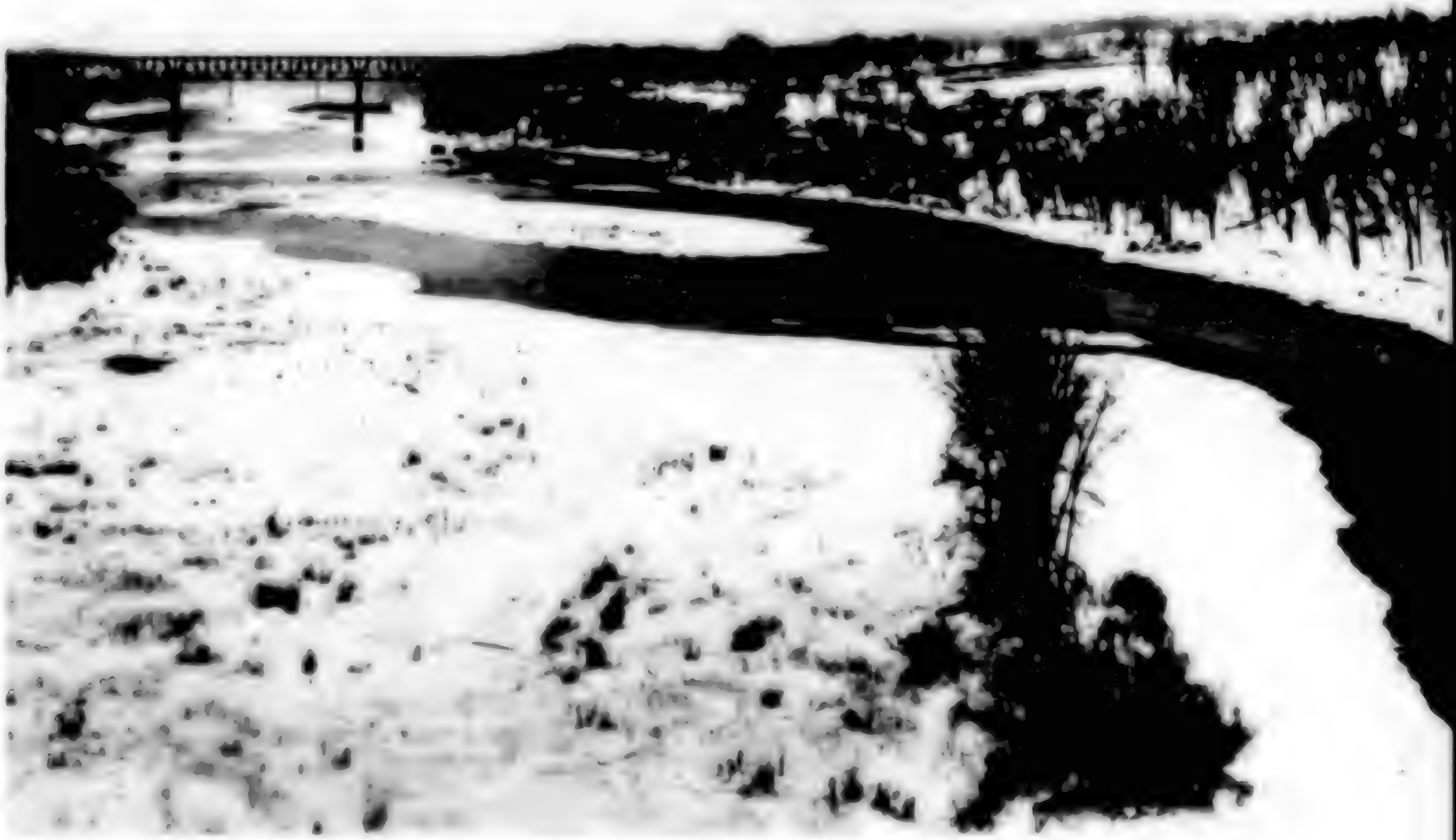
St. Paul suffered a double setback. Minneapolis had captured title to the head of navigation, but the low dams had eliminated St. Paul's hope for securing hydropower. Why Congress authorized two low dams, instead of one high dam that could have generated hydropower, is unknown. The St. Paul District commander, Major Francis R. Shunk, tried to explain the matter to Minneapolis Mayor J. C. Haynes on February 7, 1909. "Now as to the duplication of locks and dams, two instead of one. Connected with this matter is a secret history, upon which I proceed as discreetly as may be to cast a little light. There is the city of

St. Paul, and there is the city of Minneapolis. For physical reasons, a single lock and dam must lie entirely within the limits of Minneapolis, or entirely within the limits of St. Paul. . . . Enough said. There are two locks." Minneapolis had somehow won the debate over building one or two dams. While intense local issues had resulted in two dams, an equally intense national debate would lead to a new project for one.

Summary

By 1907, Minneapolis, St. Paul, Hastings and other river cities, through their successful lobbying and through the Corps, had changed the upper Mississippi River dramatically. Hundreds of wing dams and closing dams studded the river's banks from St. Paul to St. Louis. Hundreds of miles of riverbank had been secured with riprap. Five dams at the Headwaters stored the winter's snow, holding it for the summer and fall, when the millers at St. Anthony and the steamboats below would need it. And Congress had authorized, that year, a sixth dam for the Headwaters, the one at Gull Lake. A newly completed lock and dam and another one under construction promised to make Minneapolis the head of navigation. The river pioneers once forded with their wagons and livestock no longer existed. Maybe, at a few places, especially between St. Paul and Hastings, settlers could have waded across on some persistent bar during extremely low water. Congress, however, would soon authorize new projects for the upper Mississippi River that would make this impossible.

FIGURE 11. Meeker Island Lock and Dam under construction in the distance. The river in the foreground has not yet been inundated by Lock and Dam No. 1. Minnesota Historical Society.



Chapter 5

Transforming the River II: Commerce, Navigation Improvements and Hydroelectric Power, 1907-1963

By May 19, 1907, when the *Itura* steamed through the Meeker Island Lock and Dam, the Mississippi River through the MNRRA corridor had been altered in striking ways. Still, the river followed its cycles. As the spring runoff waned, the river fell and the wing dams and closing dams below the Minnesota River's mouth directed the flow to the Mississippi's main channel. As the river continued falling, mud flats extended farther and farther out from the shores. If a drought occurred, the river dropped so low that channel constriction became ineffective and people could wade across the river. At St. Anthony, the falls would slow to a trickle, unless the Corps released water from the Headwaters Reservoirs. Then the river might rise by a foot to a foot and one half. No navigation structures blocked or constricted the river between St. Anthony Falls and the Crow River, and through this reach the Mississippi's natural cycles were more evident.

Between 1907 and 1963 most semblances of the natural river would disappear. A series of new locks and dams would reshape the river's physical and ecological character. In 1913 the Coon Rapids Dam created a 600-acre pool, with an eight-foot head against it, for hydroelectric power. In 1917 the Corps completed Lock and Dam 1 *(Figure 1)* and in 1930 Lock and Dam 2 at Hastings. The Corps replaced the Lower Hydro Station Dam in 1956 with the Lower St. Anthony Falls Lock and Dam. And in 1963 the Corps completed the Upper St. Anthony Falls Lock, stretching the 9-foot channel and head of navigation 4.6 miles farther upstream.

The river still rises to its natural level during floods but cannot fall to its normal low water stages. No one can wade across the Mississippi River from Minneapolis on down. Only in two short reaches would this be possible today: somewhere between the head of navigation and the Coon Rapids Dam and above the Champlin Bridge, where the impounding effects of the Coon Rapids Dam disappear. This chapter looks at who built the dams and why. *(Figure 2)*

The 6-Foot Channel

Despite the Corps' efforts with the 4½-foot channel, river traffic declined. By 1880 the heyday of steamboating had passed. Railroads had taken most of the grain and passenger traffic away, and by 1890 timber rafting remained the only significant commerce. Timber products dominated the upper river's traffic from the 1870s to the first decade of the twentieth century. Timber shipping, however, fell with the white pine forests of western Wisconsin and northern Minnesota. At its peak, between 1893 and 1894, the lumber industry employed about 100 raft boats and 100 sawmills on the upper Mississippi River *(Figures 3 and 4)*. The number of sawmills dropped to 80 by 1900, 36 by

FIGURE 1. Bottom: By 1915, [illegible] through most of the [illegible] [illegible] [illegible] [illegible]

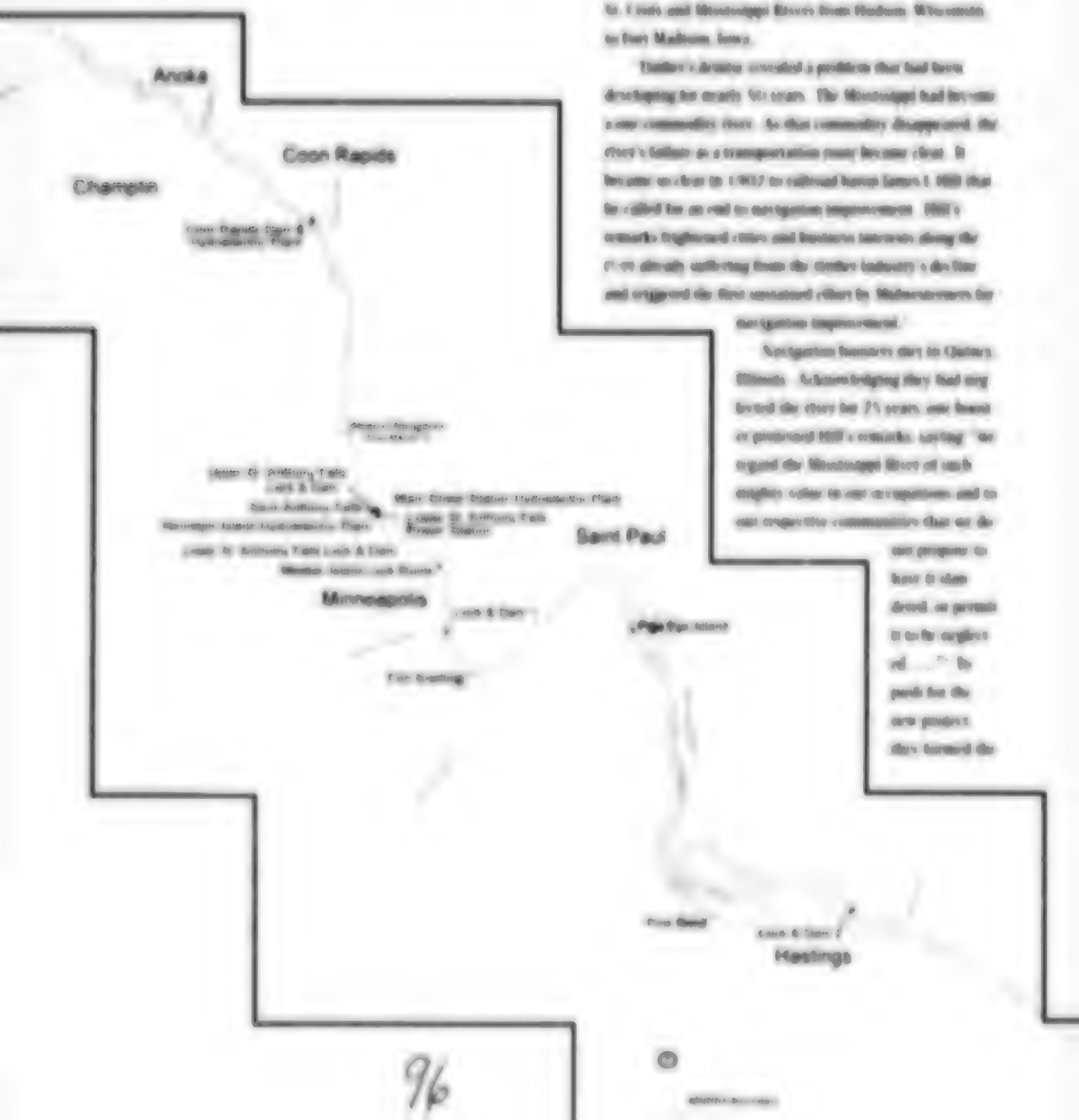
FIGURE 2. Top right: Timber raft and log [illegible] near Wabasha Street Bridge in St. Paul, 1870. Minnesota Historical Society.

FIGURE 3. Bottom right: [illegible] lumber mill above St. Anthony Falls, 1865. [illegible] Minnesota Historical Society.

1901, and 1 in 1915. Raftboats followed a similar decline. Of more than 100 raftboats plying the upper river in 1893, 66 remained in 1900, 20 in 1906, and only four in 1912. In 1915, the last lumber raft floated down the St. Croix and Mississippi Rivers from Hudson, Wisconsin to Fort Madison, Iowa.

Timber's demise revealed a problem that had been developing for nearly 50 years. The Mississippi had become a one commodity river. As that commodity disappeared, the river's failure as a transportation route became clear. It became so clear in 1907 to railroad baron James J. Hill that he called for an end to navigation improvements. Hill's remarks frightened cities and business interests along the river already suffering from the timber industry's decline and triggered the first sustained effort by Midwesterners for navigation improvement.

Navigation boosters met in Quincy, Illinois. Acknowledging they had neglected the river for 25 years, one booster protested Hill's remarks, saying "we regard the Mississippi River of such mighty value to our occupations and to our respective communities that we do not propose to have it abandoned, or permit it to be neglected . . . ." To push for the new project, they formed the


Anoka
Champlin
Coon Rapids
Coon Rapids Dam & Hydroelectric Plant
Upper St. Anthony Falls Lock & Dam
Saint Anthony Falls
Hennepin Island Hydroelectric Plant
Main Street Station Hydroelectric Plant
Lower St. Anthony Falls Power Station
Lower St. Anthony Falls Lock & Dam
Meeker Island Lock Ruins
Minneapolis
Lock & Dam 1
Fort Snelling
Saint Paul
Pigs Eye Island
Pine Bend
Lock & Dam 2
Hastings

Upper Mississippi River Improvement Association (UMRIA). Unlike the efforts behind the 4- and 4½-foot channel projects, 6-foot channel boosters established a concerted movement to win approval for their project and proposed to meet annually.

The UMRIA's task was daunting. While they tried to excite merchants and farmers throughout the Midwest to use the river, they failed. For the first two decades of the new century, farmers enjoyed a period of prosperity so strong some agricultural historians call these decades the golden age of American agriculture. Farmers and merchants away from the river enjoyed moderate rail rates. So early on, neither group pushed for the 6-foot channel.

Congress questioned the project. Rivers and Harbors Committee member Joseph E. Ransdell of Louisiana explained the problem. Speaking to the 1908 UMRIA convention, he reported that the Congress had granted the committee an average of $19.75 million per year over the last decade. Waterway boosters had projects before Congress totaling $500 million, and the Corps had already approved these projects. Consequently, he complained, "The work given to us is that of elimination, to cut off here, to slaughter there, to twist and to squirm around the difficulties and to do a little quarreling too." But the problem, he insisted, was not that there were too many projects; rather, Congress did not place the right priority on waterway development. Navigation projects, he argued, needed to be put on a par with other major programs, such as the army, navy, post office and pensions. Instead of $19.75 million averaged over a number of years, he called for an annual appropriation of $50 million.

The National Context

If the UMRIA hoped to vie with hundreds of projects, totaling hundreds of millions of dollars, America's attitude toward river and harbor spending would have to change. The UMRIA could not do this on its own. Only a national movement could generate the support needed to make Congress and the American public alter their priorities. Two such movements were under way. The first was a national waterways movement, focused specifically on navigation improvements. The second, the Progressive movement, was far broader and encompassed many aspects of American life, from business practices and urban government to the more efficient use of the country's natural resources. Both movements reflected changes occurring in the nation's attitude toward waterway development and both movements are represented by structures in the UMRRA corridor.

Paralleling the new and more vigorous system of waterway legislation, a "remarkable reversal" occurred in the public's attitude toward rivers and harbors projects between 1895 and 1917. Such projects had been largely ignored by the press before 1895, except for being criticized as pork barrel. After 1895, they became "very much in the news of the day." This time "powerful national organizations of business men

and leading politicians, supported by the full weight of the press" backed the navigation movement.

During the latter years of the nineteenth century and early years of the twentieth century, the United States "witnessed a new enthusiasm for the improvement of its navigable streams. Communities throughout the country seemed to catch a vision of the unlimited possibilities for local economic growth which cheaper transportation could create." Strongly supported by urban merchants and manufacturers, shippers fought to strengthen the Interstate Commerce Commission's power to regulate railroad rates and actively promoted inland navigation projects. As the movement gained strength, "The interests of merchants and manufacturers soon became merged with the larger interests of the entire community, as local and regional waterway publicity groups and newspaper editors warned that the future growth of the community itself depended on cheaper transportation." Support for waterway improvements grew so intense that it became an issue of "local patriotism." Many politicians recognized a windfall and eagerly capitalized on this demand. One reason for the new attitude was rail rates had begun rising.

The new enthusiasm reached the Mississippi River. "A GREAT public movement has arisen in the Mississippi Valley," W. J. McGee proclaimed. Born in Dubuque County, Iowa, McGee would become President Roosevelt's principal voice for multiple resource water development. The national navigation movement had begun, McGee said, a decade or two before when unfair railroad practices drove the packet boats out of business. The problem worsened as shipping costs increased and shipping facilities for river traffic decreased. As production from mines, factories and farms mounted, the problem grew into a crisis. McGee contended that "the discontent has grown into a movement akin to revolt on the part of the millions of farmers, small manufacturers, and retail dealers in the interior." Placing the movement in a sectional context, McGee argued that the Midwest now demanded "recognition of the rights of the interior as against those of the seaboard."

Evidencing a new interest in waterways, important waterway organizations emerged during the first years of the new century. One sought an intercoastal water route from Boston to the Rio Grande River in Texas. Navigation boosters along the Mississippi and Illinois Rivers formed the Lakes to the Gulf Deep Water Association to call for a deep channel from Lake Michigan, through the Illinois River, to the Mississippi. And boosters from St. Louis to the Twin Cities established the UMRIA. The National Rivers and Harbors Congress, created by boosters from around the country in 1901, attempted to unify these efforts.

After sputtering for several years, the Rivers and Harbors Congress hosted a conference in Washington, D.C., on January 15 and 16, 1906. The Congress reorganized and elected Rivers and Harbors Committee member Joseph Ransdell as its president. UMRIA President Thomas Wilkinson accepted a seat on the board of directors. The organization's "object and purpose," he reported to the 1906 UMRIA meeting, was to teach people about the significance of the country's waterways "and to create such a strong public sentiment, in favor of larger and more regular appropriations by Congress for river and harbors improvement, that will induce Congress to appropriate at least 50 million dollars annually for that object, instead of the beggardly amounts now appropriated. . . ." Only a national organization, he declared, could secure the funding needed for waterway improvements. The UMRIA immediately joined the Rivers and Harbors Congress, paying a $100 fee. Over the next two years, the Congress gained members from 33 states and a membership of some 30,000. Its members included "commercial, manufacturing, waterway and kindred associations, commercial firms and public spirited individual citizens." Farmers remained notably absent from the list.

Demonstrating the national waterway movement's political strength and popularity, members of Congress had openly pushed for its rebirth. As Captain J. F. Ellison, secretary of the National Rivers and Harbors Congress, reported: "The re-organization of the National Rivers and Harbors

Congress as it now exists, was by the direct request of more than a majority of the Rivers and Harbors Committee of the House of Representatives." Chiefs of Engineers, Secretaries of War and Presidents of the United States would attend and speak at the meetings. In what would be a clear conflict of interest today, Representative Ransdell had become its president and many other Representatives and Senators sat on its board. At the 1906 Rivers and Harbors Congress meeting, McGee proclaimed, "It is safe to say that during the past quarter century no other body of delegates produced so deep an impression on the legislative and executive branches of the Government." More so than the UMRIA, the Rivers and Harbors Congress would bring the need for navigation improvements on the upper Mississippi River to national attention.

The Progressive Movement · Paralleling the growing strength of the national navigation movement, another far broader movement was gaining momentum in America: the Progressive movement. While it would not affect the 6-foot channel project effort as directly as the waterway movement, it was critical to the context in which the effort occurred. It also helped define the evolution of hydroelectric power in America and, consequently, the future of the Meeker Island Lock and Dam, Lock and Dam 1, and the Coon Rapids Dam.

Scholars disagree about the causes and agendas of the Progressive movement, but they agree that between 1890 and 1920 something fundamental changed in American society, and Americans responded in new and unique ways. Whether in city slums or city halls, in the management of corporations or the management of the federal government, in the use of forests or waterways, Americans sought to bring order to their rapidly changing lives through scientific and technical rigor. Conservationists within the Progressive movement attempted to reshape how Americans approached their natural resources.

Scholars also disagree over the national conservation movement's dominant themes. Some have seen it as an attempt by activists to stop big businesses from selfishly taking the nation's natural resources. Historian Samuel Hays, leading another school, suggests that "Conservation, above all, was a scientific movement. . . . Its essence was rational planning to promote efficient development and use of all natural resources." Progressive conservationists wanted professionally trained foresters, geologists, economists and experts from other appropriate disciplines to determine how the nation used its public resources. They did not want these resources consumed through political and economic manipulations that were inefficient and wasteful. They did not object to big businesses using the country's natural resources; they objected to unplanned and wasteful consumption.

Beginning with the federal development of irrigation, they initiated a broad campaign for the multiple use of natural resources, especially water resources. Waterways, they insisted, could be used for hydroelectric power, flood control, navigation, and irrigation. Why build dams for navigation, they asked, and not consider the hydroelectric power potential? Some conservationists hoped to preserve untouched large parts of the nation's wild and scenic areas, but they were a small minority. A growing realization that America's natural resources were finite motivated most conservationists.

Hydroelectric Power · The development of hydroelectric power awakened Americans to the multiple uses that the country's rivers and streams could serve and directly affected projects on the upper Mississippi River. Hydroelectric power represented a spectacular new power source, with implications for national and regional economic development. Whoever obtained the best sites stood to make millions of dollars and gain the economic clout to dictate the growth of cities and regions. To Progressive conservationists, hydroelectric power meant more than using waterways to their fullest. It offered a way to pay for all waterway projects but, if developed unwisely, it represented the waste of a valuable natural resource.

By charging rent for the use of dam sites, conservationists hoped to finance navigation improvements without appropriations from Congress. For this reason, Hays argues, "Hydroelectric power provided the financial key to the entire multiple-purpose plan." Conservationists charged that Congress had been giving away hydropower sites for little or no fee and had been granting indefinite or inordinately long leases for these sites. They argued that the water power of a site belonged to the people of the country and those who developed it should pay a fee. As a very few large firms had won many of the best sites, conservationists worried that these firms would soon monopolize the country's hydroelectric power. Conservationists tried to establish a policy to remedy these problems.

Conservationists and their opponents generally agreed that the government had the right to charge power companies for the use of government-built dams in navigable rivers. Since the government had built the dam at the public's expense, the public had the right to be reimbursed by a company using the dam to generate power. Disagreement came over sites in navigable rivers where the government had not yet built a dam. In these cases, states' rights advocates, power companies and the Corps argued that private citizens or companies had the right to build a dam and power plant and should not have to pay any fees. They insisted that the state, not the federal government, had the authority to establish fees or set time limits for the use of such sites. Theodore Roosevelt and other leading conservationists disagreed (Figure 5).

In 1903 Roosevelt sent a warning to Congress when he vetoed a bill granting a private company the right to build a hydroelectric dam on the Tennessee River at Muscle Shoals, Alabama. Observing that requests by individuals and companies to build dams in navigable streams had increased tremendously, he asked Congress to develop a standard policy for reviewing and distributing grants to hydroelectric power developers. The Muscle Shoals bill would have given a grant without fair competition, although it did provide for Corps review and for "reasonable charges. . . ." Nevertheless, Congress continued to approve projects with few requirements.

FIGURE 5. President Theodore Roosevelt. Minnesota Historical Society

Responding in part to Roosevelt, but more so to deal with the increasing volume of requests for hydropower grants, Congress passed the General Dam Act of 1906. The Act required that Congress approve each project and that those receiving grants adhere to a limited set of conditions. While the Act did not explicitly require fees or set time limits, conservationists insisted that the act gave the Corps authority to require both. Corps leaders, backed by Secretary of War William H. Taft, held that the Act only granted them the authority to evaluate dam projects for their effect on navigation. Consequently, Roosevelt ordered the Secretary of War and the Corps to accept his views. He could not, however, convince Congress to back him. The feuding continued for the next 14 years and directly affected the development of hydroelectric power at Lock and Dam 1. Roosevelt and his conservationists had aroused the

American public to the issues surrounding the hydroelectric power development and further stirred American awareness about the use and development of water resources.

Through these efforts, conservationists recognized the need to maximize the benefits of the nation's waterways for the American public. Given the growing popularity of the national waterways movement, conservationists hoped to capture the support of navigation boosters to make multiple purpose water planning a reality. They recognized that most boosters cared only for their own projects, and conservationists began an effort to broaden those interests.

W J McGee became one of the administration's most active proponents of a multiple use program for the nation's waterways and, according to Hays, the conservation movement's chief theorist. McGee helped found the Geological Society of America and the National Geographic Society, becoming its president from 1904 to 1905. He became president of the American Anthropological Society in 1911. McGee left the Bureau of Ethnology in Washington, D.C., in 1903 to head up the anthropological exhibits for the St. Louis Exposition and became director of the St. Louis Public Museum. While he was in St. Louis, navigation improvement caught his attention.

McGee laid out his multiple use program for the nation's rivers, especially the Mississippi, in a 1907 article entitled "Our Great River." After a resounding endorsement of navigation improvements, McGee pleaded with readers to consider more than navigation. As a key prerequisite to navigation improvements, the country had to reduce the massive amounts of sediment flowing into the Mississippi and its tributaries. To reduce the sediment load, states within the watershed had to preserve their forests, and farmers had to begin practicing soil conservation. And before they began developing the Mississippi and its tributaries for navigation, they had to consider urban water supply, hydroelectric power, irrigation canals and reclamation. The individual states and the federal government had to work together to develop a comprehensive plan. The plan would include all the related branches of science and would treat the river as an interdependent system.

Together, the Progressive conservation movement and the national navigation improvement campaign brought waterway issues into the everyday life of Americans as never before. In this context, Congress passed the Rivers and Harbors Act of March 2, 1907, authorizing the 6-foot channel project, and residents of the Twin Cities would reconsider the Meeker Island and Lock and Dam No. 1 projects.

Water Over the Dam

The *Itasca* steamed into the new Meeker Island Lock on May 19, 1907, but as new as the lock was, history had passed it by. Between 1894, when Congress authorized the Meeker Island project, and 1907, when the Corps completed it, hydroelectric power came of age. At the beginning of the 1890s, most Americans viewed hydropower as a curiosity, but the opening of the Niagara Falls hydropower plant in 1894 changed this. Residents of the Twin Cities observed the transition firsthand. In 1882 the Minnesota Brush Electric Company opened the first hydroelectric power station in the United States on Upton Island at St. Anthony Falls. Although it had a limited generating capacity and few customers ready to employ its power, the station heralded the coming of hydroelectricity. Between 1894 and 1895, the Minneapolis General Electric Company built its Main Street Station at St. Anthony, and in 1897, the Pillsbury-Washburn Company completed the Lower St. Anthony Falls dam and hydroelectric plant, providing power to Thomas Lowry's Minneapolis Street Railway Company (Figure 6). These projects and successful long-distance power transmission demonstrated the practicality and value of hydroelectricity and allowed the power of the falls to reach far beyond the river.

Combined with the national interest in conservation, this awakening to hydroelectric power led residents and business interests in the Twin Cities to question why they had wanted two locks and dams immediately downstream from St. Anthony Falls. Laying aside their longstanding lead, they began working together to convince the Corps and Congress that the project should be reviewed and revamped. Congress, going through a similar awakening, and the Roosevelt administration, with its strident emphasis on conservation, readily supported the change.

In the River and Harbor Act of June 25, 1906, Congress created a commission to examine the river's hydropower potential between Minneapolis and St. Paul. The commissioners held a preliminary meeting in the capital city on March 28, 1907, to study data in the Corps' St. Paul District office and visit the sites. They did not meet again until September 26, when they completed their report and forwarded it to Alexander Mackenzie, now a brigadier general and the Chief of Engineers.

Disappointing hydroelectric power boosters, the commissioners determined that the low head, or short fall, at Locks and Dams 1 and 2 would not permit the economic development of hydroelectric power. Someday, they speculated, higher energy costs and demand from the Twin Cities' growing population would make the power gained from low head dams more valuable. Then, the hydropower capacity of the two sites would be worth capturing. Twenty to 25 years in the future, they suggested, the cities could even consider building a single high dam downstream of Lock and Dam No. 1. The Board's report reassured Minneapolis that it would remain the head of navigation and that St. Paul would not get hydropower.

The commission's report did not quash interest in developing water power at the locks and dams. The river's steep slope and narrow gorge at Lock and Dam 1, and the fact that the site lay within the major metropolis on the upper Mississippi River above St. Louis, made it the ideal undeveloped hydroelectric site on the river. And, just before the commission's first meeting, Congress changed a major premise that the commissioners failed to consider: it authorized the 6-foot channel project.

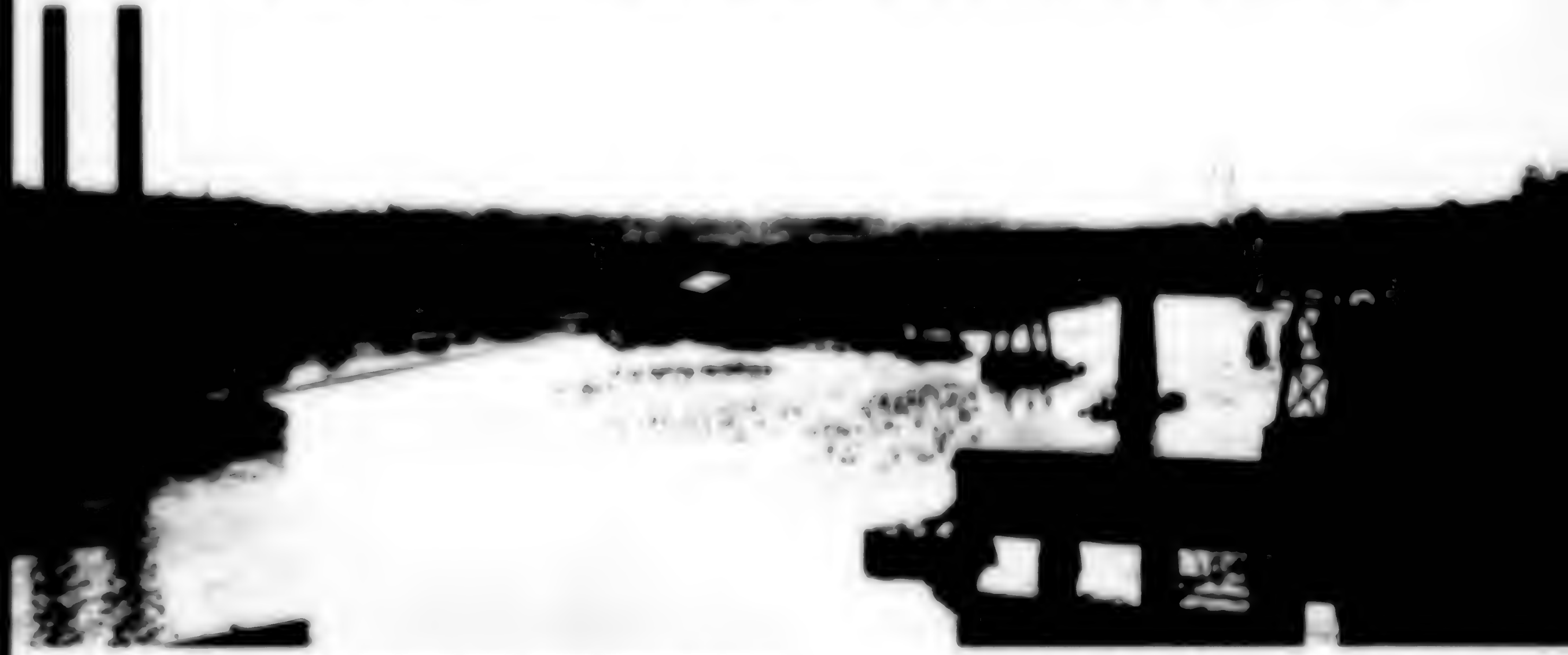


FIGURE 6. De la Barre's "folly," Lower St. Anthony Falls Dam and Hydroelectric Station, completed in 1897. St. Paul District, Corps of Engineers. The Twin City Rapid Transit Company steam powerhouse is at the far left. University of Minnesota Steamplant is at the far left.

Locks and Dams 1 and 2 had been designed for a 5-foot channel, so the Engineers had to reassess the design of each. Whatever they decided, the project's cost would increase. Now the expense of starting over could be compared to the cost of modifying the structures. And as the dams would have to be one foot higher, their hydropower potential would increase. Because of these changes and continued public pressure for a high dam, Congress, in the River and Harbor Act of March 3, 1909, authorized the Corps to examine the projects' hydropower potential again. In the spring of 1909, pending the outcome of this study, the Corps suspended work on Lock and Dam No. 1. As of June 30, the Corps had spent $1,149,153 on the two locks and dams.

To undertake the new study, the Corps appointed a board of engineers that included Majors Charles S. Riche, Francis R. Shunk and Charles Bromwell. The board considered two issues. First, they analyzed whether the Corps could easily and cheaply adapt the 5 foot project to the 6 foot project. Second, they reevaluated the hydropower capacity of the river between Minneapolis and St. Paul. The board considered the navigation issue first and quickly concluded that, with minor changes, the existing project would provide an adequate 6 foot channel.

Developing hydroelectric power raised more difficult concerns. The board concurred with the first study that the low dams could not generate power economically (even with the additional foot of height created by the 6 foot channel project). Only a high dam would make hydroelectric power economical, a high dam built at the Lock and Dam No. 1 site. By redesigning Dam No. 1 for a 30 foot raise, the Engineers estimated they could generate 15,000 horsepower.

To construct the new dam, the board considered two options. The Corps could build the dam alone or it could build the dam in partnership with a private or municipal party. Recognizing the merits of a high dam, the board noted that a single lock and dam would save operating and maintenance costs, would require only one lockage, and in providing a 9 foot depth would not have to be modified under future navigation projects. They also recognized that the Corps could use the rent gained from the hydropower of a high dam to construct and operate the new facility, and the federal government would have an endless surplus of power. But holding to standard policy, the board determined that the Corps could not build a high dam alone, if the reason for building it was only to capture the hydropower.

After extolling the advantages of a high dam to Minneapolis Mayor James C. Haynes, St. Paul District commander Major Shunk explained that "Now comes the difficulty. The United States has no business to meddle with water power, and must confine its attention strictly to features affecting navigation. . . ." If the Engineers built the project alone, they would have to justify it for navigation. Had the Corps not completed Lock and Dam No. 2 already, the board declared, it could have recommended one, government-built lock and dam. Since the two low dams would secure the depth needed for navigation, it concluded that some other party would have to pay the extra cost of building a high dam.

On the morning of June 9, 1909, the board held a public hearing in St. Paul to determine who might support and finance the dam. Representatives from St. Paul and Minneapolis attended and strongly favored the change. To their surprise, the State of Minnesota also showed interest in the project. To their dismay, private companies also appeared and backed the high dam. Interest by private companies frightened the cities and became a key issue at the meeting.

The Corps fueled worry over private development. Board member Major Shunk told representatives from the cities that the board "would listen to proposals from outside interests to pay all extra cost necessary to raise the dam to such a height as would produce desired power." Hoping to get the hydropower generated by a high dam cheaply, city and state representatives worried that the government would start a bidding war, and they "bitterly denounced" the "attitude of the government in permitting such a prospect. . . ."

Encouraged by the Corps' position, private companies attended the public meeting. A. W. Leonard, manager of the Minneapolis General Electric Company, reported that his firm could submit a proposal within 60 days and would pay the government the extra cost of constructing a high dam, estimated at $210,000. Paul Doty, representing the St. Paul Gas Light Company, contended that a private enterprise could develop the water power better than the state or municipalities. In response, representatives from the cities insisted that the federal government should favor them, because the water power was a natural resource that belonged to the cities and the state. They asked the board to grant them time to prepare a proposal, which would take much more than 60 days.

Demonstrating their interest and their worry, Minneapolis, St. Paul and the state met after the morning session to discuss a strategy for developing the river's hydropower potential. They formed a nine person commission, with three members from each party, to prepare a proposal to share in building a high dam. Constitutional requirements, however, prevented them from offering a definite proposal until after the next legislative session in two years. The state's constitution prohibited it from issuing the bonds needed to build the project, and the city charters of Minneapolis and St. Paul barred them from making expenditures for such purposes. While the state's ability to amend its constitution was in doubt, both cities planned to revise their charters. The board, in submitting its report to the Chief of Engineers, noted that "it is the opinion of the mayors of the two cities, of representatives of the city councils, and of all the representative citizens who spoke at the hearing that there will be no difficulty in obtaining legislative action modifying the charters at the next session of the state legislature." Both cities passed resolutions favoring the project.

After evaluating its options, the Corps' board dismissed working with a private company. It based this decision on the reaction of Minneapolis and St. Paul to private development. The board believed it "abundantly evident" that the two cities, which owned much of the land above the dam site, would not relinquish it to a private company. Proposing to work with a private company, the board concluded, "would be equivalent to recommending against a high dam . . . ." The two cities would rather see the power go to waste, the board reported, than let a private firm develop it.

Having eliminated construction by the federal government alone or in concert with a private company, the board elected to work with the Twin Cities to build the new high dam. It believed that the cities would change their charters because of the strong support displayed by the citizens and governments of the two cities. In a dramatic turnabout, Minneapolis and St. Paul agreed to split the cost of building the new structure and to share the hydropower. Minneapolis even agreed to advance St. Paul's share. On the basis of this overwhelming interest, the board recommended that Congress modify the navigation project to raise Dam No. 1 to 30 feet.

W. L. Marshall, the new Chief of Engineers, endorsed the board's recommendations but made an important change. Contrary to the standard Corps position, he urged Congress to fund the entire project. The "construction of such a lock and dam by the Government is feasible, practicable, and legal under existing conditions," he asserted. Sharing the costs with a nonfederal partner, he warned, had proven "conducive to friction and misunderstanding, and often attended serious complications . . . ." If the government paid the full cost, he argued, then it could keep complete control of the waterpower.

Marshall bolstered his position with other arguments. Even though the Engineers had completed Lock and Dam No. 2 and had finished much of Lock No. 1, he speculated that Congress might authorize a deeper project in the near future. The high dam would easily accommodate a project of seven, eight or nine feet. While the new structure would cost some $210,000, he contended that the hydroelectric power generated at the new dam would pay this cost and supply power to other federal offices in the Twin Cities. Once the Engineers built the power station, the government, he proposed, could run it or lease it to a private company or municipality.

Although the board's report did not show it, at least one of its members agreed with the Chief of Engineers. Major Shunk believed that Congress should authorize the Corps to build a high dam for navigation and to capture the river's hydropower. Shunk even tried to convince business men in the Twin Cities to support the project. Like other high dam proponents, Shunk argued that it would be easier to operate, would save time, and could pay for itself. He hoped that if the Twin Cities demonstrated enough demand for the project Congress would authorize and fund it. Displaying a deep seated Progressive mentality, Shunk insisted "the whole issue was not a legal concern but a moral matter." In a February 17, 1909, letter to Mayor Haynes, Shunk complained that "There is something wrong about partial measures and technically restricted vision." Officially, however, Shunk supported the position that the federal government had the authority only to regulate navigation and not to build or regulate hydroelectric power dams or plants.

On January 31, 1910, the board submitted its report to the Chief of Engineers. Following Marshall's recommendations, Congress called for a high dam in the 1910 River and Harbor Act, "Provided, That in the making of leases for water power a reasonable compensation shall be secured to the United States . . . ." Thus, the St. Paul District began modifying Lock and Dam No. 1 with federal funding. To ensure safe navigation above the new lock and dam, the Engineers demolished the top five feet of the Meeker Island Dam in 1912.

The Twin Cities could no longer gain direct control of the waterpower, but they still could vie for leasing the power. Congress had allowed the Corps to build only the base for a hydropower station, not the station itself. Section 12 of the 1912 River and Harbor Act granted the Secretary of War the authority to "provide in the permanent parts of any dam authorized at any time by Congress for the improvement of navigation such foundations, sluices, and other works, as may be considered desirable for the future development of its water power." It did not permit the government to develop the water power. Before the St. Paul District completed Lock and Dam 1, in 1917, a debate over the federal government's role in hydroelectric power development entangled the project. Consequently, the power station's base would remain unused for more than six years.

The National Debate Over Hydroelectric Power

While Minneapolis and St. Paul tried to get hydroelectric power at Lock and Dam 1, Congress wrestled with what the federal government's role in overseeing water resource development was, especially as it related to hydroelectric power. It was an issue that deeply divided the country. Lock and Dam 1 and the power station eventually built upon it embody this debate.

To prepare a comprehensive plan for developing the nation's waterways, President Roosevelt established the Inland Waterways Commission on March 12, 1907. Conceived of and headed by W. J. McGee, the Inland Waterways Commission called for a multiple-purpose approach and suggested that a single agency coordinate all water resource projects. In December 1907, Senator Francis G. Newlands introduced a bill to create such an agency. This agency would have had the power to investigate water resource problems, authorize projects, supervise construction, and coordinate the activities of all federal water resource agencies. Roosevelt strongly endorsed the bill.

Not surprisingly, Congress and the Corps opposed Newlands' bill. The Corps generally resisted the multiple-purpose approach, as it threatened the agency's role in developing and managing waterways. Newlands' agency would undermine much of the Corps' autonomy in selecting and building projects. To get the Corps and the War Department to report favorably on the bill, Roosevelt again ordered both to support him.

Many senators and representatives also rejected Newlands' bill. Determining which waterway projects to build and fund was an important and rewarding role for

Congress. Representative Theodore E. Burton, chair of the House Rivers and Harbors Committee and a member of the Inland Waterways Commission, opposed the separate agency and introduced a different proposal. Unable to gather enough support for Newlands' version, the Roosevelt Administration approved Burton's. When Congress further modified the bill, the Administration became disenchanted with it. Although the House passed Newlands' bill on May 16, 1908, it failed in the Senate.

By 1913 Congress had stalled over the government's role in developing waterways. Opponents of the multiple-purpose approach had thwarted the program, and Roosevelt conservationists had blocked unlimited leases at hydropower sites for little or no rent. In 1908, Roosevelt had begun vetoing hydropower projects that did not carry such terms. His successor and old adversary on this issue, William H. Taft, questioned this policy. But Henry L. Stimson, who became Taft's Secretary of War in 1911, "was enthusiastic over the possibilities of using revenue from water power to construct multiple-purpose river works."

In 1912 Stimson convinced Taft to veto the Coosa Dam project in Alabama because it did not provide for a rental fee. In response, Alabama Senator John Bankhead blocked a proposal by the Taft administration to develop hydropower on the Connecticut River that would have established a standard policy for hydropower development. As a result, the government became deadlocked. "This impasse," historian Philip Scarpino contends, "brought a hiatus to hydroelectric development in navigable rivers. . . ." Not until Congress passed the Water Power Act of 1920 did it establish a policy for national hydropower development, and not until then could the St. Paul District begin considering propositions to build a hydroelectric plant at Dam No. 1.

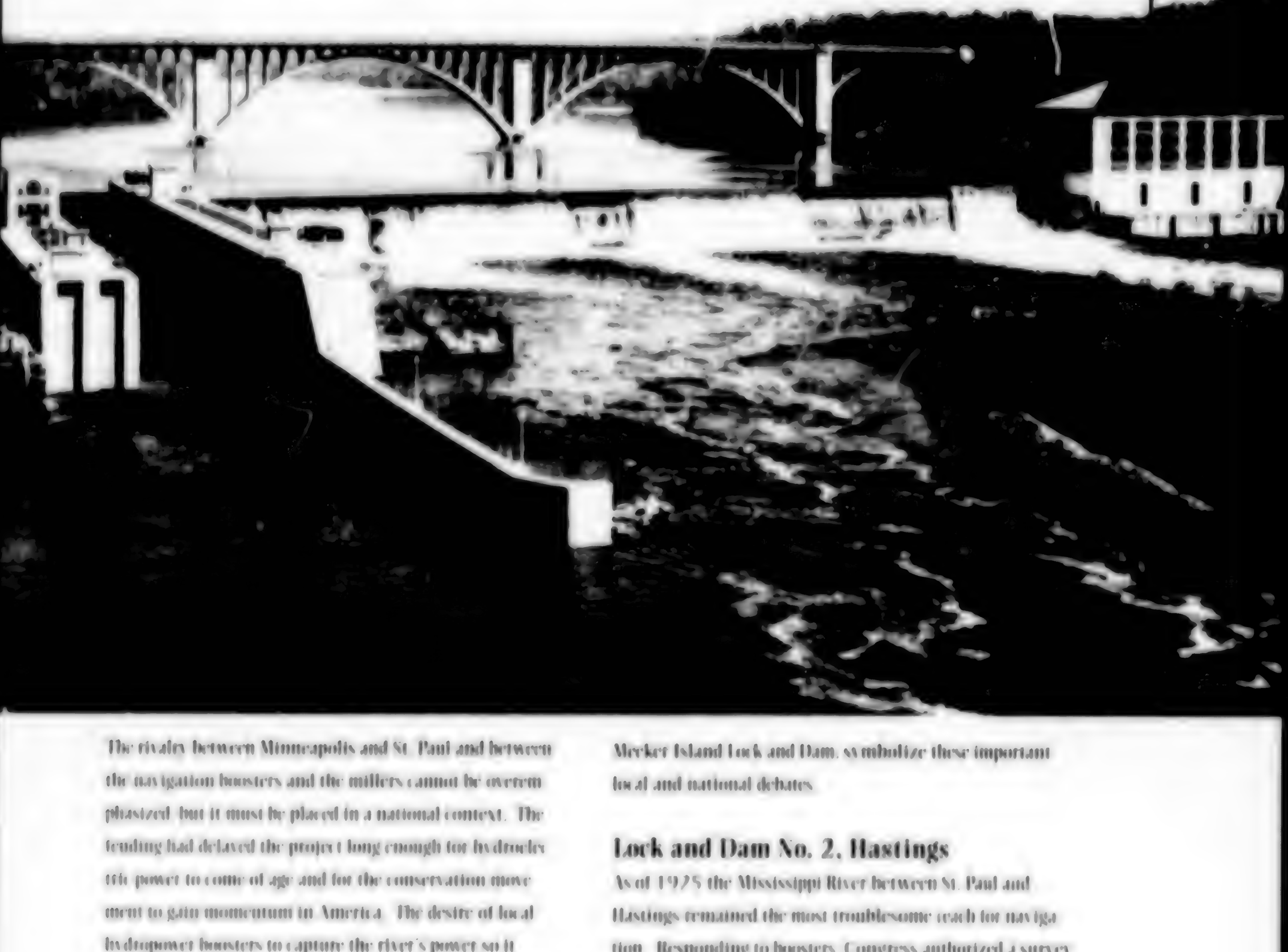
Following the Act's passage, Minneapolis and St. Paul, the Northern States Power Company, and the University of Minnesota submitted proposals for building a power plant at the site, but the Federal Power Commission, which had been created by the Federal Power Act, rejected them. In 1923 the commission finally accepted a proposal backed by the City of St. Paul and submitted by the Ford Motor Company. Ford completed the hydroelectric station in 1924, supplying power to its new truck plant on the bluff above, to the lock and dam, and to others (*Figure 7*). Finally, 60 years after being first proposed, Minneapolis had its lock and dam and St. Paul its hydropower.

In an era when conservation became a fad, destroying a new lock and dam seemed unconscionable. Many people questioned why Congress had authorized two dams rather than one and tried to place blame on one party or another. In a 1910 University of Minnesota thesis on Lock and Dam No. 1, George W. Irvine and William D. Timperley charged that Congress rejected the first bill for a high dam, in 1894, "on the grounds that power development was beyond the scope of the project, waterway improvement." In a similar thesis, three University of Minnesota engineering students repeated this charge and blamed the two-dam project on the rivalry between Minneapolis and St. Paul. Historian Lucile Kane contends that "The lock and dam built near Meeker Island proved to be an embarrassment to the government, a 'shocking blunder' some called it." This "blunder," she says, "weighed heavily on the minds of the engineers responsible for the decision." There is no evidence to support this contention, however.

Major Shunk also faulted intercity politics and defended the Corps. In his February 17, 1909, letter to Mayor Haynes, Shunk, after a long explanation of how Congress and the Corps made rigorous scientific decisions about how best to select and build water resource projects, could only explain the building of two locks and dams in the Twin Cities by saying "such things happen in countries where people have votes." As the Corps had been proposing two or more dams since G. K. Warren recommended a second dam in 1868, the control of those who wanted only low dams must have held sway for a long time.

While a "secret history" may lurk behind the decision to build two structures, the players in this history did not recognize the broad national trends that enveloped them.

FIGURE 7. Lock and Dam No. 1 with Ford Hydroelectric Power Plant. Federal law only allowed the Corps to build the base. Ford completed the hydroelectric plant in 1924. St. Paul District, Corps of Engineers.



The rivalry between Minneapolis and St. Paul and between the navigation boosters and the millers cannot be overemphasized, but it must be placed in a national context. The feuding had delayed the project long enough for hydroelectric power to come of age and for the conservation movement to gain momentum in America. The desire of local hydropower boosters to capture the river's power so it would not go to waste—a desire reflected in American society of the early twentieth century—led Congress to revamp the project, even though it had spent more than a million dollars on it. Building the hydroelectric plant also became entwined in a national debate. Thus, the plant and the lock and dam, as well as the sometimes visible remains of the Meeker Island Lock and Dam, symbolize these important local and national debates.

Lock and Dam No. 2, Hastings

As of 1925 the Mississippi River between St. Paul and Hastings remained the most troublesome reach for navigation. Responding to boosters, Congress authorized a survey of the river from St. Paul to the head of Lake Pepin. In the

River and Harbor Act of March 3, 1925. The Corps was to determine whether locks and dams were necessary to make the river navigable above the lake and review the status of river commerce.

The Corps' report, known as House Document 583, presents a sobering picture of where shipping stood in 1925. "With the exception of an occasional excursion steamer," the report noted, "the only commercial line operating on the upper Mississippi River to the Twin Cities is the River Transit Co., organized in 1922." It provided only irregular service. Twenty three railroads, grouped into nine systems, including five lines to Chicago, four to Duluth, four to the Pacific Coast and six to the South served the Twin Cities. Railroads, the Corps flatly stated, adequately served the Twin Cities and would continue to for a long time. "An increase in river transportation," the Engineers determined, "must come from competition with well organized railway service or from new business which cheaper transportation will bring to the territory."

In its preliminary examination and survey, the Corps broke the river into three reaches. The first ran from Lock and Dam No. 1 to downtown St. Paul. Here, the Engineers reported that they had nearly completed the 6 foot channel. The controlling depth in 1925, however, was only 3.7 feet. The Corps maintained it could have dredged the river to a five foot depth but did not need to since no traffic used this reach. A second reach extended from Hastings to the head of Lake Pepin. Here the Corps decided that it could easily establish the 6 foot channel by channel constriction and dredging. But in the middle reach, from downtown St. Paul to Hastings, the Engineers were far from completing the 6 foot channel and recognized that it would be impossible to do so with wing dams, closing dams and dredging.

Since Congress had authorized the 6 foot project in 1907, the Corps had undertaken little work between Hastings and St. Paul. In fact, nearly all the constriction works had been built before 1896. Still, the Engineers reported, the reach contained about 300 wing and closing dams. The Engineers estimated that there was "an average of 10 per mile" and declared that the river between St. Paul and Hastings was "probably the most completely regulated stretch of river in the country." Still, the river remained extremely shallow.

Dredging, the Engineers acknowledged, could keep the channel open only temporarily but at a cost to navigation at St. Paul and Lock and Dam 1. They reported that "As a consequence of dredging the low water surface at St. Paul has been lowered about 1.5 feet." The lower water surface reduced the amount of water over the sill or entry to Lock and Dam 1 below the design depth. Any further dredging, they warned, would make matters worse at St. Paul and Lock and Dam 1. In other words, the Corps had to dredge the channel below St. Paul so much that it lowered the water level at St. Paul. They realized that if they dredged the river enough to maintain a 6 foot channel down to Hastings, they would lose a 6 foot channel at St. Paul. Considering this problem and with little traffic using the river, the Corps had conducted no dredging in this section during 1925. At the end of the season, the low water depth was only three feet. By dredging, the Engineers insisted, they could increase the depth to four feet; still, this was two feet below the required 6 foot channel.

On the basis of its experience and growing demand for a navigable channel, the Corps recommended a lock and dam at Hastings. They estimated the cost at $3,780,310. Congress, the Engineers maintained, should consider the new structure part of the 6 foot channel project. Since channel constriction alone could not create a 6 foot channel, and dredging too much lowered the water surface from downtown St. Paul up to Lock and Dam 1, it became clear that a lock and dam was necessary. As the only large metropolis on the upper river above St. Louis, the Twin Cities provided the justification for the whole effort: all the work below the cities meant little if the navigable channel ended 30 miles downstream.

Accepting the Corps' arguments and lobbying by local boosters, Congress authorized Lock and Dam No. 2 at Hastings in the River and Harbor Act of January 27, 1927.

Congress did not immediately fund the project, however. Consequently, the Upper Mississippi Barge Line Company, an organization that had formed to restore commerce to the upper river, loaned $10,000 to the Corps to undertake the preliminary surveys, design work and borings. Finally, on May 22, 1928, Congress provided funds and ordered the Corps to begin construction. The St. Paul District let a contract to begin work on October 16, 1928. Although the District did not complete Lock and Dam No. 2 until November 10, 1930, the first barges, pushed by the towboat S. S. *Thorpe*, locked through on June 27 *(Figure 8)*.

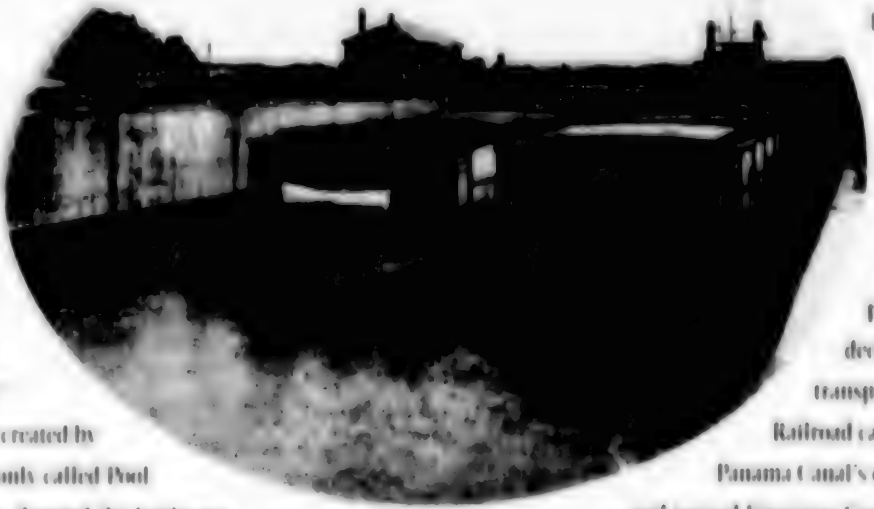


FIGURE 8. First lockage at Lock and Dam No. 2, Hastings, June 27, 1930. St. Paul District, Corps of Engineers.

The reservoir created by Dam No. 2, commonly called Pool 2, has permanently changed the landscape and ecology of the Mississippi River from Hastings to Lock and Dam No. 1. While the river can rise to its historic high stages, it cannot fall to its natural low levels. The wing dams that once studded the river now lie submerged, indicated only by telltale ripples on the water's surface. For 52 years these simple dams had increasingly defined the river's physical and ecological character. They still funnel water down the main channel, but the vast sandbars that had once been trapped between them are gone or no longer visible. The river may look more natural without the wing dams, but it is equally artificial, equally a human artifact.

The 9-Foot Channel

Six days after the first towboat and barges passed through Lock and Dam No. 2, Congress authorized the 9-foot channel project. Under this project, the Corps constructed 23 locks and dams from just above Red Wing, Minnesota, to Alton, Illinois, during the 1930s. All the locks and dams on the upper Mississippi River are now part of this project. Upper and Lower St. Anthony Falls joined the system in 1956 and 1963, respectively. Lock and Dam No. 3 at Red Wing (completed in 1938) creates a reservoir that extends up to the Hastings lock and dam and, therefore, defines the river's landscape in the southernmost end of the MNRRA corridor. For these reasons, we need to briefly examine the history of the 9-foot channel project.

Despite all the Corps' [illegible] 4- and 6-foot channel projects, [illegible] through traffic moved between St. Paul and St. Louis by 1918. As the region's need for a diverse transportation system had grown, its shipping options had declined, creating a transportation crisis. Railroad car shortages, the Panama Canal's opening in 1914 and several Interstate Commerce Commission decisions combined with channel construction's failure to effect, Midwesterners declared, an "economic barrier" around their region. Although the Engineers had built thousands of wing dams and had closed many of the river's side channels, they had been unable to create a dependable navigation channel. All too frequently droughts and floods made the channel impassable. Rail car shortages occurring in 1906-07, during World War I, and in 1921, caused acute, short-term shipping crises, and pointed out the Midwest's dependence on railroads.

The Panama Canal's opening in 1914 redefined the Midwest's transportation problems. While railroad car shortages had been infrequent, the Panama Canal created a problem that promised to become steadily worse. Economically, the Panama Canal moved the East and West coasts closer to each other while moving the Midwest farther away from both coasts. Businesses could ship goods from New York to San Francisco through the Panama Canal cheaper than Midwesterners could ship goods to either coast by rail.

The transportation crisis climaxed with the Interstate Commerce Commission's (ICC) decision in the Indiana Rate Case of 1922 and the subsequent decisions that upheld it. On October 22, 1921, the Public Service Commission of Indiana and others challenged the Midwest's railroad rate structure. For unfair reasons, they argued, railroads operating out of Illinois and cities along the west bank of the Mississippi River in Missouri and Iowa charged lower rates than railroads running out of Indiana. Railroads running along the river charged lower rates because a 1909 decision by the ICC had upheld the lower rates based upon the potential and reality of waterway competition. In the Indiana Rate Case, the ICC reversed this decision. Now it stated, "Water competition on the Mississippi River north of St. Louis is no longer recognized as a controlling force but is little more than potential." In effect, the commission declared the Midwest landlocked. On February 11, 1922, the ICC ordered railroads operating along the river to raise their rates, leading to a 100 percent or greater rise in some Midwestern shipping rates. Appeals by the defendants and waterways advocates delayed the decision's implementation until June 1, 1925.

In response to the growing transportation crisis, Midwestern business and navigation boosters initiated another movement to revive navigation, a movement that surpassed all previous movements. Between 1925 and 1930, they fought to create consensus and to persuade Congress to authorize a new project for the river, one that would allow the river to truly compete with railroads. It would draw support from the largest and smallest businesses in the valley, from most of its cities, from the Midwest's principal farm organizations, and from the major political parties.

An editorial in the May 12, 1928, *St. Paul Pioneer Press* entitled "An Inland Empire's Need" captures the region's sentiment best:

> *In common with the impulses of all ambitious peoples, the Northwest's aspirations for growth, for prosperity, for power, find expression in demand for ready access to the sea. With its millions of population, its rich resources, and its unlimited possibilities for commercial growth, this region is like a giant, tied just beyond reach of a nobler destiny, straining at his chains. We are landlocked, a marooned interior, shut in by the barriers of costly overland carriage, to and from the common highway to the world's markets, the sea.*"

Responding to this movement, Congress included the 9-foot channel project in the 1930 River and Harbor Act. The Corps built the locks and dams during the Great Depression, providing labor for thousands of unemployed workers. By 1938 the St. Paul District had completed Lock and Dam No. 3, and the Corps would finish the whole project by 1940.

On the basis of their representation of New Era and Great Depression history, Locks and Dams 3 through 26 have been determined eligible for the National Register of Historic Places. Although Lock and Dam No. 3 is outside MNRRA's boundaries, its reservoir defines the river's landscape and ecosystems in that part of the pool within the corridor's boundaries. To interpret the historic landscape and ecology of this part of the corridor requires an understanding of the national significance of the 9-foot channel project.

Fulfilling the Dream: St. Anthony Falls Upper Harbor Project

Navigation advocates in Minneapolis, watching the 9-foot channel project under construction below, recognized that with two more locks and dams they could make their city the head of navigation. Anxious to fulfill the dream they had held since the 1850s, Minneapolis navigation supporters and their Congressional delegation pushed hard to have the project extended. On August 26, 1937, Congress, with insistent lobbying by Minnesota Senator Henrik Shipstead, granted their wish by enacting the Upper Minneapolis Harbor Development Project. Minneapolis agreed to contribute $1,714,000 to the project for bridge and utility modifications and purchasing land.

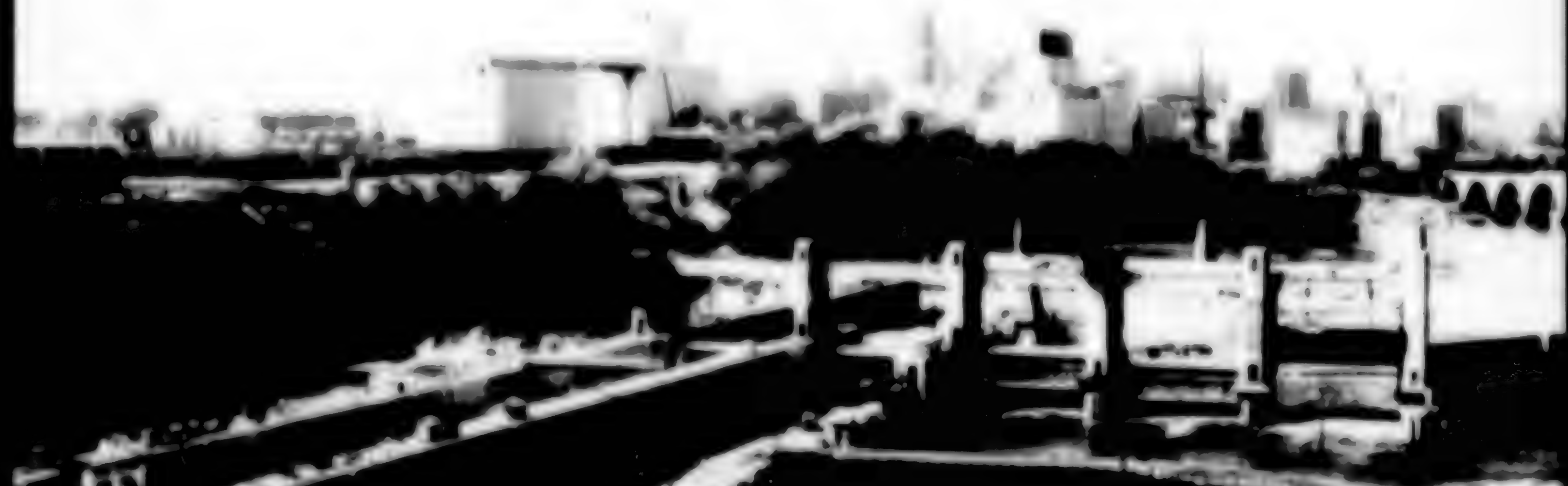
The project called for building the Lower St. Anthony Falls Lock and Dam, the Upper St. Anthony Falls Lock, dredging, and modifying bridges and utilities. The project would extend the head of navigation, the farthest upriver barges and tows could be sure of a 9-foot channel, by 4.6 miles. World War II, complex economic and engineering studies and land acquisition delayed construction until 1948, when the Corps began dredging for a 9-foot channel.

Because of the area's fragile geology (made evident by the Eastman Tunnel fiasco, see Chapter 6) and the density of urban development, the Corps had to devise an innovative design and unique construction methods. In 1949 the Corps built a 1 to 50 scale model of the project site from Hennepin Avenue to the Washington Avenue Bridge at the St. Anthony Falls Hydraulic Laboratory at the University of Minnesota.

Work began on the lower lock and dam during the summer of 1950. To build the Lower St. Anthony Falls project, the Corps removed the existing dam completed by the Pillsbury Washburn Company in 1897. The new dam tied into the old hydropower station (Figure 9). The Engineers planned to build the project in four years, but because of foundation problems and large floods in 1951 and 1952, it took seven years, opening in 1956.

On November 12, 1959, the Corps broke ground for

FIGURE 9. Lower St. Anthony Falls Lock and Dam under construction, 1953. St. Paul District, Corps of Engineers.



work on the upper lock. This lock, at 49.2 feet, has the highest lift of any lock on the Mississippi River. On September 21, 1963, the towboat Savage, pushing a barge loaded with cast iron pipe, became the first to pass through the lock (*Figure 10*). Barges and tows could now move from the heart of Minneapolis to the Gulf of Mexico. Minneapolis had fulfilled a dream imagined over 110 years earlier.

Coon Rapids Dam

Like the other dams on the Mississippi in the MNRRA corridor, the Coon Rapids Dam redefined the river's upstream landscape and ecology. Its history–the political, social and economic contexts in which it was conceived of and built–tells important local, regional and national stories. Hydroelectric power developers began considering a dam and electric generating station at Coon Rapids (or Coon Creek Rapids as it was originally known) as early as August 1898. A survey was under way and advocates hoped that the new project would begin by the next year. Thirteen years passed, however, before Congress approved the project and another two before construction began.

William de la Barre, the eminent mastermind of hydropower development at St. Anthony Falls, reviewed the Coon Rapids Dam design for H. M. Byllesby & Company. Overall, de la Barre liked the plans and site location. He concluded that there was no reason why "this water power project should not be carried to a successful completion, and become one of the permanent sources of power for this part of the country."

As construction became imminent, the *Anoka County Union Herald* excitedly reported that engineers and "a crew of several hundred laborers are coming from New York and other places" to build the dam. The paper expected 1,000 workers. When they began arriving, the Northern Mississippi Power Company (a Byllesby subsidiary) established a camp, a "little city," on the Mississippi's east bank

FIGURE 10. Upper St. Anthony Falls Lock under construction, 1961. St. Paul District, Corps of Engineers

in 1913. "Streets were laid out, a store, clubhouse, hospital, office buildings, school, dormitories, new houses, carpenters shops and storehouses were built." As the city met and exceeded the prediction of 1,000 workers, the company added a movie theater, dance hall and billiard parlor.

Then on November 26, 1913, the *Union Herald* announced that the St. Anthony Falls Commercial Club was pressing Congress for a lock in the dam. The Commercial Clubs of St. Cloud and Anoka also backed the lock idea. The lock, potentially, would extend navigation 70 miles upstream. While the dam was already under construction, Congress, as part of its effort to define the role of the federal government in hydroelectric power development in navigable waters, had mandated that dams built in navigable waters have locks. A lock would have to be built at the power company's expense, an estimated $150,000.

Minnesota Representative George R. Smith presented the case for the lock to the Secretary of the Interior and Congress. W. B. Boardman of the Minneapolis Real Estate Board claimed that "This water passage would tap much of the richest territory in the state and would make it possible eventually to transport iron ore in barges from the range to Minneapolis." He thought that the addition of one or two more dams upriver would extend navigation to Brainerd. The ore, he predicted, would lead to the growth of smelting and steel industries in the Twin Cities." Boardman's hopes and those of the commercial clubs promoting navigation were dashed by Lieutenant Colonel Charles Potter, the St. Paul District commander. Potter declared the river above Coon Rapids would not be navigable for at least two to five years. Therefore, the power company did not need to build a lock.

The way clear, the company pressed the large crew day and night. They poured 12,000 cubic yards of concrete and over 800 carloads of crushed rock into the project. They built a brick powerhouse on the east side "and fitted it with the most modern machinery for development of electricity." By late 1914, the facility was ready to generate power (*Figure 11*). The fixed crest dam created a 600 acre pond that extends seven miles upstream to the Champlin Bridge in Champlin. The pond provides a head of eight feet at the dam but gradually thins to the river's natural elevation upstream from the Champlin Bridge.

Once the company completed the project, most of the workers left, and the city that had grown up around it was torn down. The project had not been completed without incident. A local account of the project relates that, "The Father of Waters was harnessed to do the work of man, in spite of strikes, flood waters and even a riot."

Because of increasing maintenance costs and the limited profit generated by the facility, Northern States Power Company (NSP) decided to close the facility in 1966. In 1969 NSP donated the dam and land around it to the Hennepin County Regional Park District. Now Hennepin and Anoka Counties manage the Coon Rapids Dam Regional Park on their respective sides of the river. By 1995 high water and ice had severely damaged the old dam, and the Minnesota Department of Natural Resources condemned the structure. After a series of public meetings, the dam was torn out. As the dam's original foundation was still good, a new dam, completed in 1997, was built on top of it. NSP removed the powerhouse, which has not been replaced.

While no structures associated with the old dam remain, the dam area and the construction site associated with it merit interpretation as part of the early history of hydroelectric power development in Minnesota and the country. The site provides a fascinating look into the social and political history of hydroelectric development in Minnesota.

Navigation and hydropower projects in the MNRRA corridor, from the mid nineteenth century to the present, have defined the river's physical and ecological character. They have shaped the corridor's economic history, and they have determined how cities in the corridor use the river, whether for the intended purposes or not. Some projects, like channel construction and the locks and dams, are part of national and regional stories, yet they have their local stories too. And local projects, such as the Coon Rapids Dam and the Meeker Island Lock and Dam, relate to national issues, debates and movements.

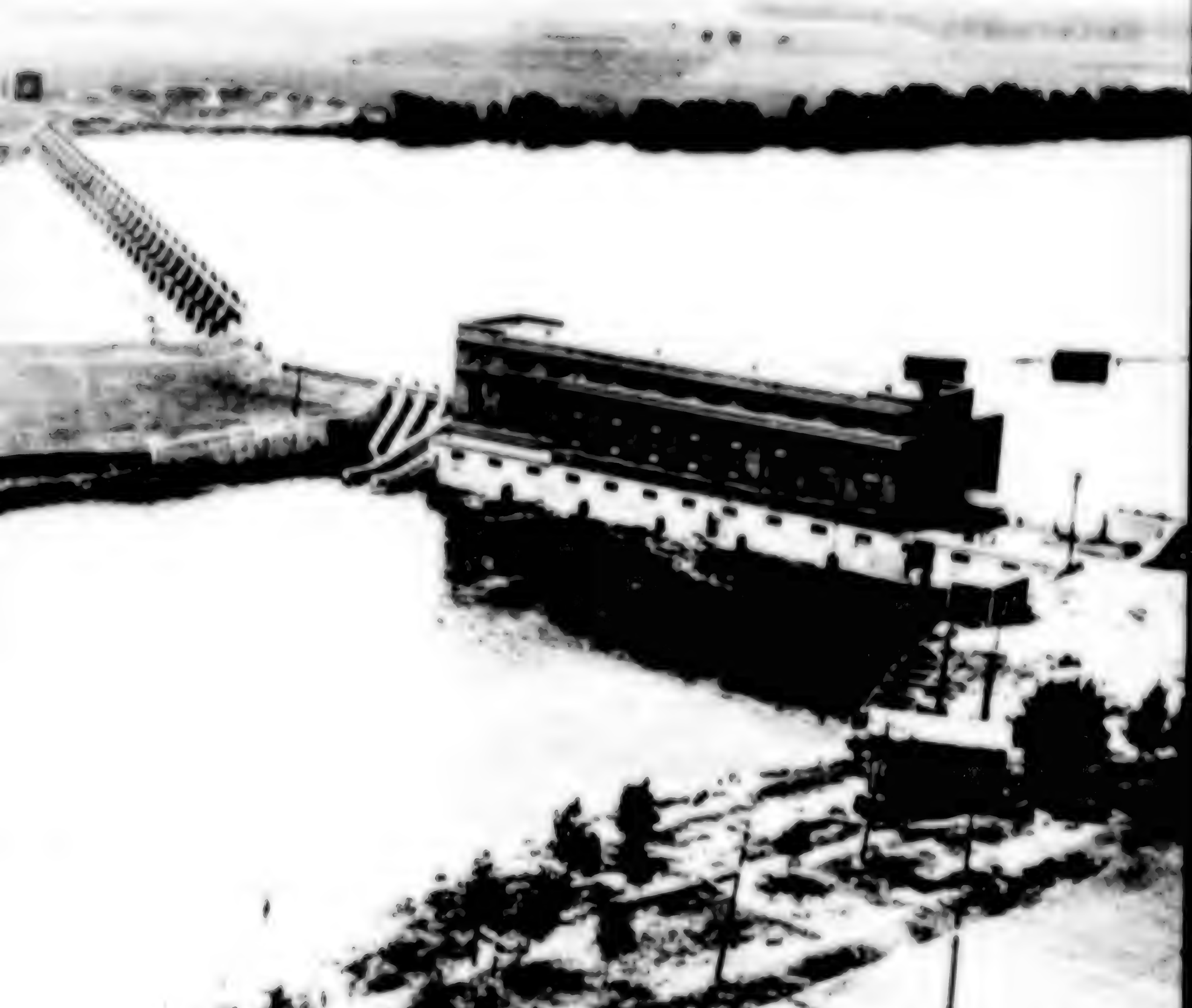


FIGURE 11. Coon Rapids Dam and Power Plant, 1932. Photo by Paul Hamilton, Minnesota Historical Society.

FIGURE 1. Reconstructing St. Anthony Falls. Artist: Peter Gui Clausen. 1869. Minnesota Historical Society.

Chapter 6

St. Anthony Falls: Timber, Flour and Electricity

No place anchors the MNRRA corridor's significance like St. Anthony Falls. No place in the corridor can match its regional, national, even international significance. Geologically, it is unique. St. Anthony Falls is the only major falls on the upper Mississippi River. Historically, its visitors and commentators comprise a who's who of European and American exploration: Father Louis Hennepin, Jonathan Carver, and Zebulon Pike, to name a few. Economically, it created a city with no peer west of Chicago to the Rock Mountains and south to St. Louis. It gave birth to the saw milling and flour milling industries that became the leading producers of their commodities in the United States and the world. Minneapolis would be the nation's flour capital for 50 years. Technologically, the falls produced the first commercial hydroelectric central plant in the country. The St. Anthony Falls area boasts two National Historic Landmarks – the Pillsbury A Mill and the Washburn A Mill – and, the Great Northern Railway Bridge, a National Engineering Landmark. For these reasons, St. Anthony Falls merits a special look. *(Figure 1.)*

Geology

Millers at St. Anthony Falls thought themselves blessed by the Mississippi River's geology. As detailed in Chapter 1, the riverbed above the falls is made of a thick mantle of hard Platteville limestone. The limestone covers a veneer of shale and mixed sandstone. Beneath these lies a deep deposit of soft St. Peter sandstone. Millers drove shafts through the limestone and shale and then easily excavated their tailraces to the toe of the falls. What they considered a blessing, however, they almost destroyed.

The same geology admired by the millers allowed the falls to retreat upriver. Imagine standing on the bluffs overlooking the Mississippi valley near downtown St. Paul about 12,000 years ago. You would be drenched by the spray and deafened by the roar of an immense waterfall. It measured some 2,700 feet across and stood 175 feet high. The meltwaters from the colossal glacial Lake Agassiz, lying in northwestern Minnesota and in southern Canada, thundered over it. As the water boiled back at the soft sandstone, it undermined the limestone riverbed. Soon, the unsupported limestone broke off, and the falls receded upstream, and the process began again. By 1680, when Father Hennepin became the first European to see the falls, it lay roughly 1,500 feet downstream from its present location.

Native American History

We know little about the Native Americans' relationship to the falls over the last 12,000 years. *(Figure 2.)* Few artifacts telling of their presence have been found. Some fluted points (Clovis and Folsom) and unfluted lanceolate spear

FIGURE 2. Owahmenah ("falling water"), one of at least several Dakota names given to the falls that Father Louis Hennepin would rename St. Anthony. Lithograph, Hermann J. Meyer. St. Paul District, Corps of Engineers.

points (Plano) found along the river demonstrate that Native Americans visited the corridor as early as the Paleo Indian era *(see Chapter 2)*. Where they viewed the falls from or where they might have portaged around it probably changed from decade to decade, and, at times, from year to year, as the falls retreated. The potential for archeological sites associated with the falls, therefore, exists along the entire route of its migration.[1]

When Europeans arrived, the Dakota commanded the area, although the Chippewa ventured down the Mississippi to attack the Dakota. From Hennepin's 1680 account, we know the Dakota used the Mississippi as a route for hunting and warfare. While the Chippewa occupied the Headwaters area by the late eighteenth century and early nineteenth century, the Dakota remained dominant around the falls.[2] George Catlin, who visited the cataract in 1835, depicts the Chippewa portaging around it. The Chippewa had visited Fort Snelling.

Native Americans probably had many names for the falls, names describing its character. We know the Chippewa used Kakabikah (the severed rock) and Kichi Kakabika (the great severed rock) for the fractured limestone blocks that littered the area below the falls. The Dakota called the falls Minirara (curling water), O-Wa-Mni (whirlpool), Owahmenah (falling water), and HaHa Tanka (big waterfall).

Although the details are sketchy and Hennepin's account is suspect, we know the falls possessed energy, spirituality and history for the Dakota. In 1680, as his party was portaging around the falls, Hennepin saw a Dakota man who had climbed an oak tree near the falls and was "weep ing bitterly. . . ." The man was praying to Oanktehi, who resided below the falls and was, according to Hennepin, the spirit of waters and evil. Hennepin writes that the man "had a beaver robe dressed neatly, whitened inside, and decorated with porcupine quills, and was offering it in sacrifice to this cataract, which is terrifying and admirable." During his prayer, the man pleaded: "'You, who are a spirit, grant that our tribe pass by here tranquilly without mishap. Grant that we may kill many buffaloes, destroy our enemies, and bring here captives, some of whom we will sacrifice to you.'"

In the 1817 account of his expedition, Major Stephen Long tells the story of Dark Day or Ampato Sapa, a Dakota woman who killed herself and her two children after her husband took a second wife. Her husband watching, she plunged over the falls in a canoe with their children. Her spirit was said to haunt the falls and Spirit Island. We cannot know what aspects of these accounts are fact, what the Dakota really told early explorers, or why they told it to them. But the legends indicate that the falls undoubtedly possessed many stories and traditions for the Dakota.

The falls also served as a source of a special clay. During his 1820 expedition, Henry Rowe Schoolcraft observed that the Dakota collected a "brownish red" clay from "close under the sheet of the principal column of water. . . ." They used the clay to paint their baskets and canoes. Schoolcraft described the clay as being "an aluminous substance very much mixed with iron pyrites in a state of decomposition, and penetrated with vegetable juices." From Schoolcraft's account, it is not clear whether the Dakota mixed vegetable juices with the clay or if the clay appeared this way naturally. The Dakota, he judgementally wrote, "pretend that it is renewed when taken away." The Dakota, of course, were not pretending; they believed that some spirit at the falls supplied the clay. How many stories, legends, traditions, ceremonies and spirits the Dakota, Chippewa or other Native American Indians had for the falls, we cannot begin to guess.

Some Dakota bands lived around the falls or not too far away when the early explorers and settlers arrived. Cloud Man had a village (Eatonville) at Lake Calhoun and occasionally camped at the falls in the summer. Good Road's band of about 10 tipis sometimes stayed near what is now downtown Minneapolis. We also know that the Dakota tapped the sugar maples on Nicollet Island. Kaposia, both the old and the new (1830s 1854), lay downriver near Daytons Bluff.

Chaotic Majesty

Seeing St. Anthony Falls today, it is hard to imagine what it looked like in its natural state. The locks and dams, the concrete spillway, the two overflow spillways, the bridges, the buildings, the power lines and poles, and the miscellaneous clutter obscure what the falls was like, challenging our ability to imagine its pristine character. Water sliding over the spillway or slipping through turbines bears no resemblance to the way water broke raucously over the fractured limestone long ago. Fortunately, European and American explorers, government officials and early tourists left descriptions of the natural falls. To them, it was a geologic marvel and a geographic anchor. The accounts they penned are important not just for what they tell about the falls. The people themselves were important figures participating in the process of exploration, trade, and settlement. *(Figure 3.)*

Most early visitors felt a need to compare St. Anthony to Niagara and other falls, weighing St. Anthony's quality and importance by standards that did not fit. In 1680 Hennepin estimated the falls plunged 40 to 60 feet. Twenty years later, Jean Penicaut, the second explorer to leave a description, agreed with the higher figure. Both exaggerated. In 1766 Carver judged the height to be about 29 feet. Cutting its stature even more, Zebulon Pike calculated that the falls dropped only 16½ feet. While the cataract had migrated upstream between visits, this cannot account for the gap between Hennepin's and Pike's numbers.

More than likely Hennepin and Penicaut exaggerated and miscalculated. Carver and others suggest a reason. Carver explained that the rapids below the falls "'render the descent considerably greater, so that when viewed at a distance, they appear much higher than they really are . . ." In 1817 Long expanded on this observation. He figured the vertical fall at 16½ feet, but, he reported, the rapids began several hundred yards above the falls and continued for eight miles below. Relying on Pike's estimate, he noted that from the beginning of the rapids to about 4,030 feet down to the "portage road" the river fell about 58 feet. With this estimate, the total drop from the beginning to the end of the rapids approached 75 feet. If Hennepin and others included part of the rapids in their estimates, they may not have been so far off.

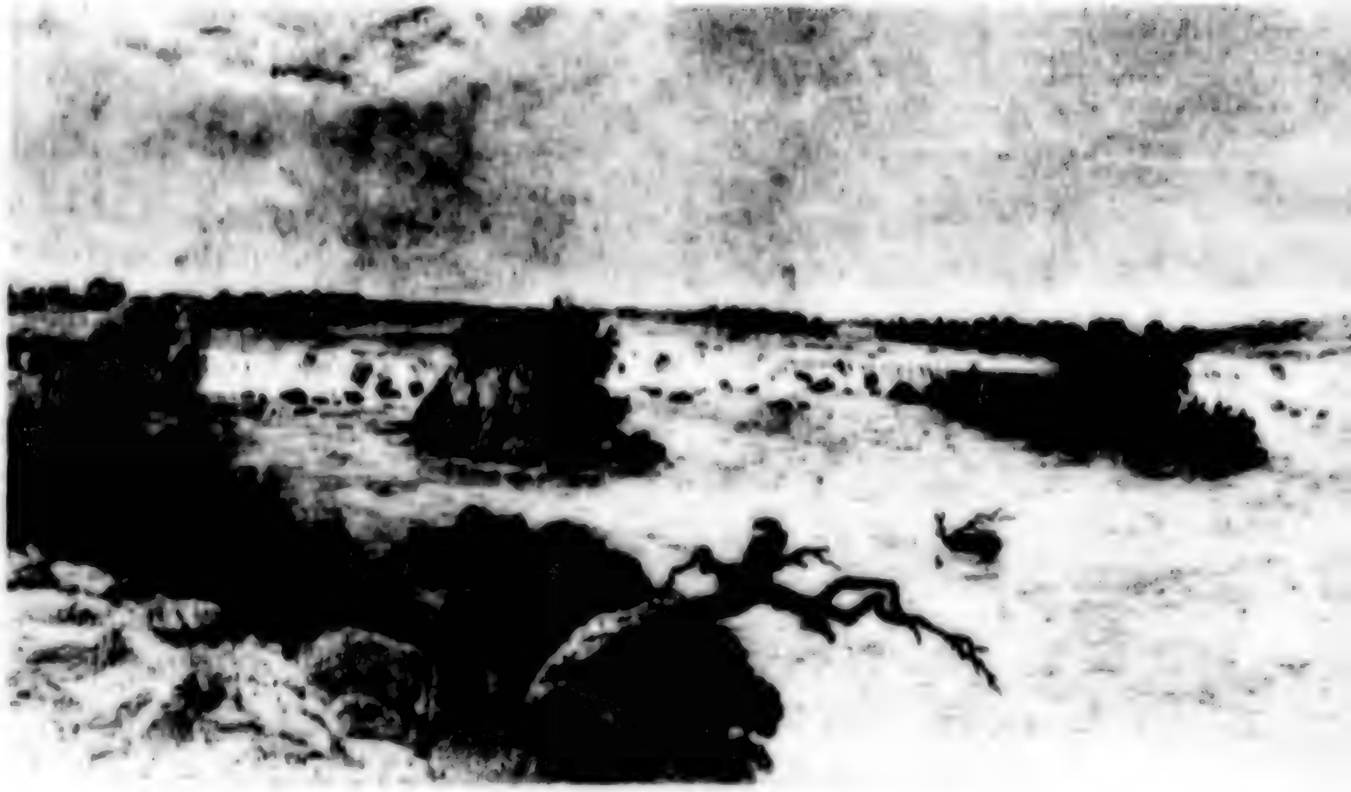


FIGURE 1. St. Anthony Falls' last days. Although dated 1853, this engraving by Seth Eastman does not show the dam built by Franklin Steele in 1848 that ran from the east bank to Nicollet Island. The west side dam would be completed in 1857. The saw and grist mills built by soldiers from Ft. Snelling in the early 1820s are visible at the left. Artist: Seth Eastman. Engraving courtesy of David Wiggins.

St. Anthony Falls disappointed those who compared it to other cataracts. Hennepin began the comparison game, remarking that the height of St. Anthony "'doth not come near that of Niagara.'" Pike, having read earlier descriptions and seeing the falls at low water, was unimpressed when he passed going upstream. Even more critical, painter and explorer George Catlin derided the falls as "'pygmy in size to Niagra.'" While some left disappointed, most departed with respect, admiration and praise.

St. Anthony Falls did not need a great plunge to make it impressive. Its unique geology provided the rough canvas over which the water flowed to create an image most found captivating. Sharp and jagged, St. Anthony's leading edge dispersed the Mississippi into a myriad of falls over which the water sometimes dropped in clear sheets. The jumble of limestone slabs that had toppled from the falls kicked the water in all directions. The forested islands—Nicollet, Hennepin, Spirit, Upton, and Cataract—divided the river, adding to the complex flow of water in, around, over and down from the falls. All these features combined to offer a spectacle that overwhelmed most, if not all, visitors. Even if Hennepin thought St. Anthony small compared to Niagara, he found that the water pouring over the falls was "'terrible, and hath something in it very astonishing.'" And Carver, despite estimating the falls to be 20 to 30 feet shorter than Hennepin, remarked that ". . . I was greatly pleased and surprised, when I approached this astonishing work of nature. . . ." He raved that "'a more pleasing and picturesque view cannot, I believe, be found throughout the universe.'"[10]

Carver further expands our image of the falls. Two small islands, he wrote, lay below the falls. One was Spirit Island. About an acre in size, it possessed "several oak (cedar) trees on which are a vast many eagles' nests." The reason for the eagles' nests, he explained, was "the great numbers of fish that is killd (sic) in attempting to get up and down the falls." Eagles swooping through the mists of St. Anthony to clutch fish trying to migrate above the falls may be hard for people to imagine since migrating fish can no longer get above Lock and Dam No. 1 and some of the other dams below. Even Pike changed his mind about the falls. When he returned down the Mississippi River at high water, he wrote, "'the appearance is much more sublime, as the great quantity of spray which in clear weather reflects from some positions the colors of the rainbow, and when the sky is overcast, covers the falls in gloom and chaotic majesty.'"[11]

Visiting the falls in 1820, Henry R. Schoolcraft also thought St. Anthony less awesome than Niagara. Still, he found it possessed a unique beauty. It had, he observed, "a simplicity of character which is very pleasing." Employing the language of his day to characterize a landscape, he commented: "We see nothing in the view which may not be considered either rude or picturesque, and perhaps there are few scenes in the natural topography of our country, where these features are blended with more harmony and effect." The landscape's transition around the falls also struck Schoolcraft. Above the falls, he observed, the prairie came up to the river.[12] Below the falls the river fell into the gorge that would characterize its path down to Fort Snelling before entering the valley through which it coursed for hundreds of miles.

Picturesque landscapes exuded a rough and irregular character. By their scale, sublime landscapes evoked a sense of danger or astonishment. St. Anthony provided both.[13] Lt. James E. Colhoun captured the sense of astonishment, scale, and roughness presented by the falls. A member of Stephen Long's second expedition, he visited the falls in July 1823. ". . . I confess," Colhoun admitted, "I was at first disappointed from the difficulty of embracing the whole at once. I thought the islands and the piles of rocks in front rather caused unpleasant obstruction of the view than lent savage grandeur to the scene. But they possess a peculiarity; the sheet of water, furnishing every variety of cataract in shape and shade, continues unrent, though alternately salient and retiring, sometimes many feet." Revealing how shallow the river could be, Colhoun waded across it a few yards above the falls. While the river was never above his thigh, he admitted the current would have carried him over the falls had he slipped.[14]

Giacomo Beltrami, an Italian romantic and traveler who accompanied Long's 1823 expedition, waxed more eloquent. Writing to his wife, he gushed, "What a new scene presents itself to my eyes, my dear Madam! How shall I bring it before you without the aid of either painting or poetry?"[15] Resting on a knoll about one half mile from the falls he, nevertheless, tried.

> *. . . I see, . . . two great masses of water unite at the foot of an island which they encircle, and whose majestic trees deck them with the loveliest hues, in which all the magic play of light and shade are reflected on their brilliant surface. From this point they rush down a rapid descent about two hundred feet long, and, breaking against the scattered rocks which obstruct their passage, they spray up and dash together in a thousand varied forms. They then fall into a traverse basin, in the form of a cradle, and are urged upwards by the force of gravitation against the side of a precipice, which seems to stop them a moment only to encrease their violence with*

> *which fling themselves down a depth of twenty feet. The rocks against which these great volumes of water dash, throw them back in white foam and glittering spray; then, plunging into the cavities which this mighty fall as hollowed, they rush forth again in tumultuous waves, and once more break against a great mass of sandstone forming a little island in the midst of their bed, on which two thick maples spread their shady branches."*

Adding to the aura of St. Anthony Falls was the sound created by water breaking over the falls and bursting through the jumbled limestone boulders. In 1700 Penicaut said the falls roared like "'thunder rolling in the air.'" Carver claimed he could hear the falls from 15 miles away. More astonishing, George W. Featherstonhaugh, a British born geologist who visited the falls in 1835, insisted he heard the falls from almost 30 miles away. On the evening of September 10, while making camp not far above the mouth of the St. Croix River, he reported hearing a "deep throbbing sound coming at intervals from a great distance. . . ." Asking his men about it, they told him it came from St. Anthony Falls. ". . . I retired to my tent rather late," Featherstonhaugh confided to his journal, "listening to the throbbing sound of the cataract until I fell asleep." While such accounts seem absurd, people clearly heard the falls from far away. With all the noise in our world today, it is hard to imagine the quiet of the surrounding area or the force of the falling water that would have allowed anyone to hear the falls from such a distance. Up close, the noise must have been deafening.

Sound came not only from the falls. On the evening of July 17, 1817, Long stayed just below the cataract. "The place we camped last night," he wrote, "needed no embellishments to render it romantic in the highest degree." The bluffs, he estimated, rose about 100 feet high and were covered with vegetation. "A few yards below us," he continued, "was a beautiful cascade of fine spring water, pouring down from a projecting precipice about one hundred feet high." The river rushed by and St. Anthony was visible upstream. Together, he exclaimed, "The murmuring of the cascade, the roaring of the river, and the thunder of the cataract, all contributed to make the scene the most interesting and magnificent of any I ever before witnessed."

French scientist, Joseph N. Nicollet visited the falls in 1838 and put many of the elements together. To him, "with the noisy boiling of its waters, rebounding in jets from the accumulated debris at its foot, its ascending vapors, and the long and verdant island that separates the two portions of the falls with the solitary rocky island that stands in front altogether," the falls created "a grand and imposing spectacle . . . ." Having led government expeditions on the Mississippi and Missouri Rivers to map their watersheds, Nicollet had seen plenty of rivers.

The descriptions of St. Anthony's natural character expanded following the visits of these explorers and travelers. Their writings and the advent of steamboat navigation on the upper Mississippi River in 1823 gave rise to the "fashionable tour," as wealthy easterners ventured to see the river and the falls. Writers, artists, and tourists also journeyed to the falls and left their visual and written accounts, adding to and embellishing upon St. Anthony's grandeur, a grandeur that would soon disappear.

Working the Falls

The increasing numbers of settlers and squatters around Fort Snelling may have appreciated St. Anthony's beauty, but they anxiously waited to capture the energy and the economic promise it offered. As early as 1819, Lt. Colonel Henry Leavenworth recognized the falls' hydropower potential. To support the fort's construction and operation, Leavenworth suggested building saw and grist mills at St. Anthony. His successor, Colonel Josiah Snelling, built the mills and two barracks on the west bank between 1821 and 1823. The mills presaged the future of St. Anthony, for much of its fame would come from the milling of timber and flour. These commodities, along with hydroelectric power, would largely define the falls' legacy and physical character.

Other than Fort Snelling's mills and associated buildings, the falls remained largely natural until 1847. Small changes had taken place around the mills. By 1833 soldiers had built a farmhouse and stables and grazed some 200 head of cattle nearby. But private development at St. Anthony was not yet possible, since the land around the falls lay inside Fort Snelling's military reservation. The [illegible] cession extended for nine miles along both sides of the Mississippi River above the fort. Nevertheless, 157 squatters had settled on the reservation by October 1837. Based on the frontier tradition of preemption, the squatters hoped to get first choice to lands within the reservation. Under preemption, settlers who had established a claim on the land prior to its official sale had the first opportunity to purchase the land they occupied. Living on land next to the falls could give a squatter the rights to the hydropower based on another tradition, that of riparian rights, which held that the person occupying the land next to a body of water had the right to the water passing by their land.

In 1837 the territorial governor negotiated treaties with the Dakota and Chippewa that excited the squatters. Ratified in 1838, the treaties gave the U.S. government title to the land between the St. Croix and Mississippi Rivers. This should have excluded the land within the Pike cession, but just prior to the treaties, Joseph Plympton, Fort Snelling's commandant, had undertaken the first detailed survey of the fort's boundary. Hoping to establish his preemption rights over all others, Plympton deliberately excluded the falls' eastern shore from the military reservation (although the Pike cession had clearly included it). This opened the eastern shore to settlement, once the United States had acquired title to it from the Dakota. The 1837 treaty provided the title.

News that treaties had been ratified arrived on July 15, 1838, with the steamboat *Palmyra*. Commandant Plympton only had to stake his claim next to St. Anthony to complete his plan. But, during the middle of the night, a young entrepreneur named Franklin Steele beat him to the site. When the commandant's men arrived the next morning, Steele was already entrenched (*Figure 4*).

Born in Pennsylvania, the 25 year old Steele was a storekeeper at Fort Snelling and part owner of the St. Croix Falls Lumber Company. He would become the founder of the milling industry at St. Anthony. Since the east side (the town of St. Anthony) would become part of Minneapolis, he can be considered a contributing founder of that city as well. Other squatters quickly established their claims to the lands east of the river. The west side, however, would not become available officially until 1856.

FIGURE 4. Franklin Steele, the founder of commercial timber milling at St. Anthony Falls. Kane, The Falls of St. Anthony.

Timber · As of 1838, Steele had most of what he needed to put St. Anthony Falls' tremendous power to work. In timber he had a natural resource sufficient to ensure the falls' energy would be fully employed, at least for as long as he could imagine. From St. Anthony to the Mississippi's headwaters and beyond, conifers and hardwoods shaded 70 percent of what would become Minnesota. The Mississippi and its tributaries provided the transportation routes needed to deliver the raw material to the power source and to ship the finished products to local, regional and national markets. But Steele still needed two important elements: official title to the land and capital. For these, Steele would have to wait some years, until 1847, before he could begin to realize his ambitions.

Steele might have begun milling sooner if he could have found the money, but the money was tied to the title. When Steele met with the representative of two potential eastern financiers, the representative questioned the security of Steele's preemption claim. The 1837 Dakota treaty gave the United States title, but the United States had not yet put the land up for public sale. What if the government rejected Steele's claims and let someone else buy the land? The investors would lose their money. Despite the investors' worries, Steele persuaded them to join his venture in July 1847. First, however, the investors sent a lumber surveyor into Minnesota's pineries to determine how much timber the pineries held and to assess the navigability of the Mississippi and its tributaries for floating logs. The surveyor dispelled the investors' fears, reporting that the timber was "almost inexhaustible." Steele finally got an agreement. The financiers committed $12,000 for a nine-tenths interest in the property. Not until March 1848, however, did Steele receive the funds. On May 8, 1848, President James K. Polk finally declared the first land sales in what would become Minnesota, and Steele officially acquired his claim on September 8, 1848. On part of his land Steele platted the town site of St. Anthony.

Trusting that the money and title would come soon, Steele had begun developing his land, initiating the demise of the natural falls. In July 1847 he built a mess hall, carpentry and blacksmith shops, stables, and a bunkhouse. In October his crews began work on a dam, cutting logs on the Rum River and floating them to a boom at the Rum's mouth. Although the boom broke on November 1 and the logs escaped, Steele's workers cut hardwoods on Nicollet Island and brought timber from the St. Croix mills to complete the dam and sawmill in 1848.

The dam lay a short distance above the falls on the east side. Nicollet and Hennepin Islands divided the river into two channels just above the falls. The dam blocked the east channel, "running from the shore to a point twenty feet above the head of Hennepin Island and then to the foot of Nicollet Island." Secured to the limestone riverbed, the dam extended for some 700 feet and stood 16 feet high. Founded on a base 40 feet wide, it tapered to 12 feet at the top. By the end of 1848, two up and down saws operated on the new dam. The millpond upstream held the logs until ready, and a 50 foot wide platform in front of the mill stored the cut lumber.

Steele's dam and mill heralded the end of an epoch and the beginning of a new era for St. Anthony Falls. During the epoch, which had lasted from the retreat of the glaciers until 1847, natural forces defined the falls' physical appearance, the sounds it made, and the rate and path of its retreat. After 1847 the site and sounds of the natural falls rapidly disappeared, and human actions defined its physical character and the rate of its retreat. New sounds reached visitors approaching the falls. The dam also heralded a new era for the new territory's forests and prairies, as the timber milling spurred the clear cutting of Minnesota's forests and as flour milling would soon fuel the plowing of the prairies and the planting of countless wheat fields.

Steele sent logging crews into the north woods near the mouth of the Crow Wing River on December 1, 1847, to fell logs for the mill. His representatives negotiated with Chief Hole in the Day of the Chippewa for permission to cut the timber. The chief agreed, for the price of 50 cents per tree. By March, Steele's men had sawed some 1.5 million board feet of timber. That spring and many springs after, logs bobbed downriver to the mills at St. Anthony to feed the booming need for houses and commercial buildings. This first season, however, the mill did not begin cutting until September 1, 1848. Steele sold the lumber as fast as he sawed it.

From 1849 to 1852 the number of sawmills increased from one to four, and daily production grew from 15,000 board feet to 50,000. By 1855 the daily output had jumped to 100,000 board feet and the yearly output to 12,000,000. Much of the lumber floated downstream to St. Louis, although the burgeoning communities at the falls and at St. Paul demanded more and more.

Steele's success intensified interest in the falls' west side. Would be lumber barons gazed over the river, knowing that whoever grabbed the land on the west would control half the power. The federal government, however, had refused to lease or sell the old Fort Snelling mills or any land on the west side to private citizens. While Plympton's cartographic license and the 1837 treaties had opened the east to settlement, the west side remained squarely within the Fort Snelling military reservation.

Nevertheless, in 1849, two individuals gained a foothold on the western shore. Robert Smith, an Alton, Illinois, businessman, and a representative in Congress, requested a five year lease on the Fort Snelling mills and on a house built near them. His plan, he claimed, was to live in the house and grind flour for local use. Fort Snelling's commandant complained that Smith was conniving to gain control of milling on the west side. Although the War Department had denied others, Smith secured the lease. Smith was not a complete outsider. He had purchased land in St. Paul, and some thought he should be Minnesota's first territorial governor.

Later in 1849 Franklin Steele suggested to John H. Stevens, a friend, that Stevens request 160 acres above Smith. Steele's idea was that Stevens propose to ferry troops and supplies for the newly built Fort Ripley in northern Minnesota in exchange. The ploy worked, and during the winter of 1849 to 1850 Stevens built the first permanent home in what would become Minneapolis.

Then, in the summer of 1851, the government negotiated the Treaties of Traverse des Sioux with the Sissetons and Wahpetons and the Treaty of Mendota with the Mdewakantons and Wahpekutes, under which the Dakota ceded nearly all their lands in Minnesota. In 1852 Congress passed a bill removing 26,023 acres from the 34,000 acre military reserve, including the area around St. Anthony Falls. While these actions did not officially open the west side to settlement, they were enough to encourage a rush by squatters. By 1854 some 300 squatters inhabited the west side. Finally in 1855, Congress amended the 1852 Act that removed land from the military reserve and recognized the squatters' preemption rights. Squatters living on the west side could now buy the land they claimed. New settlers hurried across the river, and beginning in 1855, the government started selling the land. By 1856 the west side's population had jumped to 1,555.

In 1856 the west and east side interests formed consolidated companies to manage their power and obtained perpetual charters from the Minnesota territorial legislature. Smith, joined by 11 others who had staked claims to the west side waterpower, formed the Minneapolis Mill Company. The following year, Dorilus Morrison, one of the most important partners, convinced his cousin Cadwallader C. (or C. C.) Washburn, from Maine, to join the company, and C. C. then persuaded his brother William D. Washburn to join the firm in 1857. By 1865 the Washburns, Morrison and Smith owned the company outright. Morrison and the two Washburns would build St. Anthony into the nation's leading milling center, but their interests went beyond milling. Morrison would serve as Mayor of Minneapolis in 1867 and become a state senator. C. C. Washburn (who left Maine in 1839, moved to Iowa, Illinois, and finally Wisconsin) made La Crosse his permanent home after 1861. Wisconsin elected him to Congress and as their governor. William Washburn served in the Minnesota legislature and in Congress. *(Figure 5.)*

Across the river, Steele and his partners created the St. Anthony Falls Water Power Company in 1856. Steele's partners included three New York financiers: John F. A. Sanford, Frederick C. Gebhard, and Thomas E. Davis. In 1868, after years of financial problems, the St. Anthony firm reorganized. The new board and officers included men whose names would become well known in the history of Minneapolis and the state: John Pillsbury, Richard and Samuel Chute, Sumner Farnham, and Frederick Butterfield.[11]

In 1856, with the Minneapolis Mill Company ready to develop the west side, the two companies had to divide the water. Consequently, the Minneapolis Mill Company built a dam out into the river and then angled it to a point upstream to meet the dam constructed by the St. Anthony Company. Together the dams created an inverted V in the river that directed water to the mills on either side. This left the center of the falls dry and exposed during low water and contributed to the deterioration of the central falls. Finished in 1857, the new dam established the basic shape of the falls upstream of the spillway (nearly the shape it has today). While Steele's dam and mills had begun transforming the east side, the new structure (the first full dam on the river) completed the transformation of the falls, especially once the Minneapolis Mill Company began erecting mills on their new dam.[11]

The dam created the infrastructure needed to capture the falls' power. But Steele's St. Anthony Falls Water Power Company struggled to expand its milling operations. Poor management, difficult relations with its eastern financiers, and bad timing thwarted the company's efforts. The same year the two companies completed the dam, America fell into a depression. In 1861, before the St. Anthony firm could recover, the Civil War began, arresting the company's plans. For years, the company did little to expand its milling capacity. The St. Anthony Company did support the development of mills on Hennepin Island and along the east bank, but it had to use ropes and wheels to transfer power at the falls to these mills and to operations on Nicollet Island. The rope system, however, worked best near the falls.[1]

On the west side, the Minneapolis Mill Company's unified management and financial stability allowed it to invest its property despite the depression. The company modeled its operating system after renowned Massachusetts milling centers such as Lowell, Holyoke, and Lawrence. They hired Charles Bigelow, an engineer from Lawrence, to design their system. The plan would expand the company's direct power capability away from the falls. It called for building a central canal to divert water from above the falls to the multiple head races of mills built

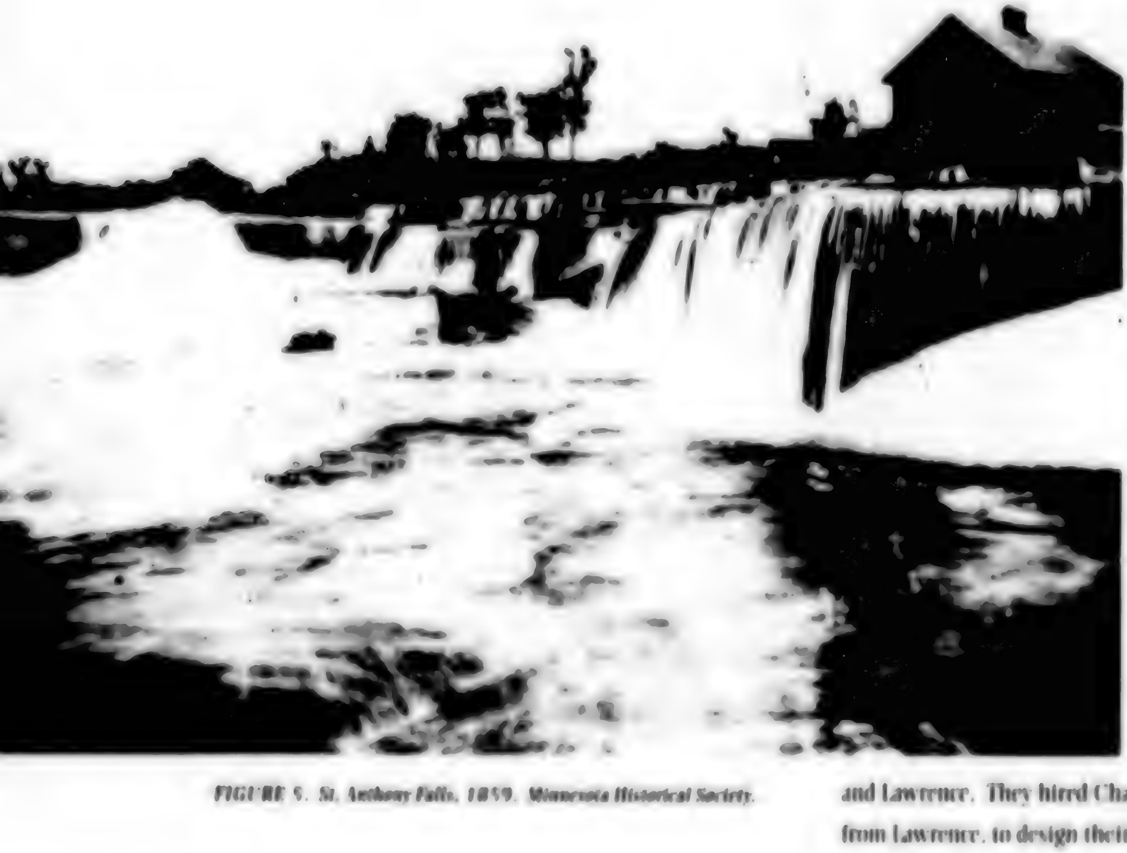


FIGURE 5. St. Anthony Falls, 1859. Minnesota Historical Society.

along the canal. Construction began on the new system in 1857 and continued despite the economic depression. Workers broke through the limestone cap and removed the soft sandstone for a canal that was 14 feet deep, 50 feet wide, and 215 feet long. The company extended and deepened it in later years. The canal system included turbine or wheel pits, a labyrinth of underground tunnels, head races and tail races, and an open canal. Together the system ran for three miles. By 1869 the west side produced twice as much lumber as the east.

With its canal system, the west side's production and population expanded dramatically before the Civil War. The east side mills, limited to ropes and pulleys, had stagnated. In 1866 or 1867, the St. Anthony Company tried to build a canal system of its own into the east bank. But after digging several hundred feet, workers ran into a large cave. Since constructing a canal through the cave would have cost too much, the St. Anthony Falls Mill Company gave up. The geology that had given birth to the milling industry was holding it back now on the east side.

Based on the Minneapolis Mill Company's success and on the sputtering output from the St. Anthony Company, lumber milling became vital to Minneapolis (which joined with St. Anthony in 1872). Beginning with Steele's 1848 lumber mill, timber commanded production at the falls. The annual output grew from about 12 million board feet in 1856 to about 90 million in 1869. The mills on the east and west rows (the side by side mills built on platforms out over the falls) accounted for much of this. Six mills stood on the east side (five on the row and one on Hennepin Island). Between 1858 and 1869, Joel Bassett, Morrison, William D. Washburn and others built eight mills on the west side row, patterned after those in the eastern United States. In all, 18 lumber mills operated at St. Anthony by 1869, with 18 different owners *(Figure 6)*. But in 1869 and 1870, disasters threatened production.

Saving St. Anthony • A scheme developed by William W. Eastman and John L. Merriam to expand milling above the falls caused the first industrial calamity. Eastman and Merriam bought Nicollet Island in 1865, including its waterpower rights. They then accused the millers at the falls of taking their water. To avoid a protracted legal battle, the millers compromised. They agreed to let Eastman and Merriam build a mill on Nicollet Island and run a tailrace to it from the toe of the falls. On September 7, 1868, the two entrepreneurs began excavating their tailrace. By October 4, 1869, their workers had tunneled through 2,000 feet of sandstone, under the limestone riverbed. The tunnel ran from the edge of the falls, under Hennepin Island, to the toe of Nicollet Island. That morning, the workers discovered water leaking and then pouring into the tunnel's upper end. The water quickly ate away the soft sandstone. Within hours, the six foot square tunnel grew into a cavern up to 90 feet wide and 16½ feet deep. The next morning, the limestone riverbed collapsed. A large whirlpool formed.

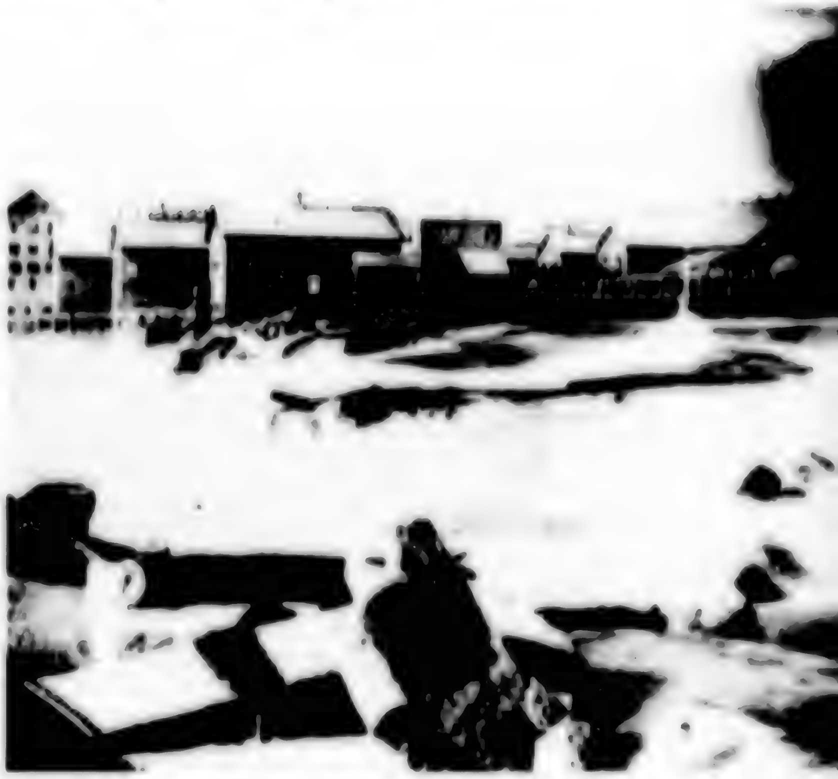


FIGURE 6. West side platform mills, about 1868. Photo by Jacoby. Minnesota Historical Society.

sucking in everything nearby and spitting it out the tunnel (*Figure 7.*)

Immediately word spread that the falls was going out. One witness recalled that "proprietors of stores hastened to the falls, taking their clerks with them; bakers deserted their ovens; lumbermen were ordered from the mills; barbers left their customers unshorn; mechanics dropped their tools; lawyers shut up their books or stopped pleading in the courts; physicians abandoned their offices."[15] Responding to the emergency, volunteers built a large raft and floated it over the whirlpool. They piled on dirt, rocks and debris until it sank and plugged the hole, but another whirlpool appeared. The volunteers built more rafts and sank them over the new break. By the afternoon, they inspected their work and celebrated "the triumph of human skill and brain power over the dumb force of nature."

FIGURE 7. Eastman Tunnel collapse, Hennepin Island, 1869. Minnesota Historical Society.

Nature took exception. As people scrambled off, the river devoured the feeble structures. One local newspaper exclaimed that the whirlpool "tossed huge logs as though they were mere whittlings," standing them on end "as if in sport" and swallowed them.[16]

Residents of Minneapolis and St. Anthony and the millers knew they could not stop the falls from eroding. So they turned to the Corps of Engineers, which had established a regional office in St. Paul in August of 1866. The Corps examined the falls in November 1869 but had no money and no clear authority to help. Then, on July 11, 1870, Congress gave the Corps $50,000 to preserve the falls. Without the falls, local citizens had argued, the river above Minneapolis would become a shallow, unnavigable rapids. To save navigation above the falls (and milling), the Corps began working at St. Anthony on August 9, 1870.

For three years the river foiled the efforts of the Corps, the millers, and local citizens. They tried to plug holes and line the tunnel with concrete. But the water kept finding new ways under the limestone, scouring new tunnels and cavities, and the falls continued to erode. After a detailed survey of the river above the falls, the Engineers learned that the limestone cap ended less than 1,000 feet above the cataract. Water was seeping under the cap and eating its way through the sandstone. Unless they stopped this, water would undercut the remaining limestone, and the falls' 12,000 year journey would end. Emphasizing the futility of their efforts, a flood swept through a cofferdam on the west side of Nicollet Island on April 15, 1873, opening a gap 150 feet wide. Water poured into the tunnel, drowning one man and destroying large parts of the repair work.

Recognizing that they could not save the falls by plugging the leaks, the Corps convened a special board of engineers at St. Anthony Falls on April 14, 1874. The board made three recommendations: 1) direct some water to the center of the falls to keep it from drying out; 2) build a new apron to protect the edge of the falls; and, most importantly, 3) build a massive wall under the limestone from one side of the river to the other. Everyone agreed.

On July 9, 1874, the Corps began building the wall. First they excavated a 75-foot deep vertical shaft on Hennepin Island. Next they dug a horizontal tunnel four feet wide and six feet high just below the limestone. Then workers began digging out a space for the concrete wall. In places, the wall would extend 39 feet below the limestone, which varied from 11 to 25 feet thick. Above the limestone lay the sand and the muck and the river. *(Figure 8.)*

Building the wall was not easy. Quicksand, flooding, and continuing collapses threatened the workers. Despite these problems, the Corps completed the wall by November 1876. It extended 1,850 feet and contained nearly 15,000 cubic yards of concrete. When the Engineers finished the wall, the *Minneapolis Tribune* reported that "This artificial fortress is to stand guard for ages and defy the floods," and that the wall would ". . . Eclipse Nature and Hold Up the Mississippi River."[9] The great wall stabilized the falls and ensured that both Minneapolis and its milling industry would continue to expand. The wall is still in place, under the limestone cap at St. Anthony Falls, still helping to prevent the falls from eroding.

After completing the wall, the Corps secured the rest of the falls. Between 1876 and 1880, the Corps completed the apron over the falls. They built the two low dams above the falls to maintain a safe water level over the limestone. They constructed a sluiceway to carry logs over the falls. And, finally, the Corps filled all the tunnels and cavities under the limestone, with some 22,329 cubic yards of gravel.

The second calamity struck one year after the Eastman tunnel collapsed. During the evening of October 20, 1870, an employee of the St. Anthony Company's east side mills tried to fill a lit kerosene lantern. It exploded and set fire to the entire row of mills, burning them down and crippling the dam. Uninsured, the St. Anthony Falls Water Power Company could not afford to rebuild and sold the dam's five water power sites.[10]

The Lumber Mills Leave • Despite the disasters, lumber milling remained central to the city's economy. By the end of 1878, the new owners had rebuilt the east side mills on a new dam midway down Hennepin Island. And by 1880 the mills on the east side row and Farnham and Lovejoy's mill on Hennepin Island surpassed the west side. East side mills accounted for 94,977,595 board feet of the city's total timber output of 179,585,182. In 1870 the annual value of timber products milled in Minneapolis equaled $1.73 million and led the city in product value. By 1880 the annual value of the city's lumber products had swelled to $2.74 million, but had fallen to second in the value of output behind flour. Still, lumber remained the city's largest employer.[11]

Timber milling, however, was on its way out, not as an industry important to Minneapolis, but as an industry based upon waterpower at the falls. A number of factors contributed. Most importantly, steam offered an economic alternative power source. Some sawmills had converted to steam power as early as the 1850s and 1860s. Since they could burn their scraps for fuel, timber millers stood to benefit from the shift to steam more than most industries.

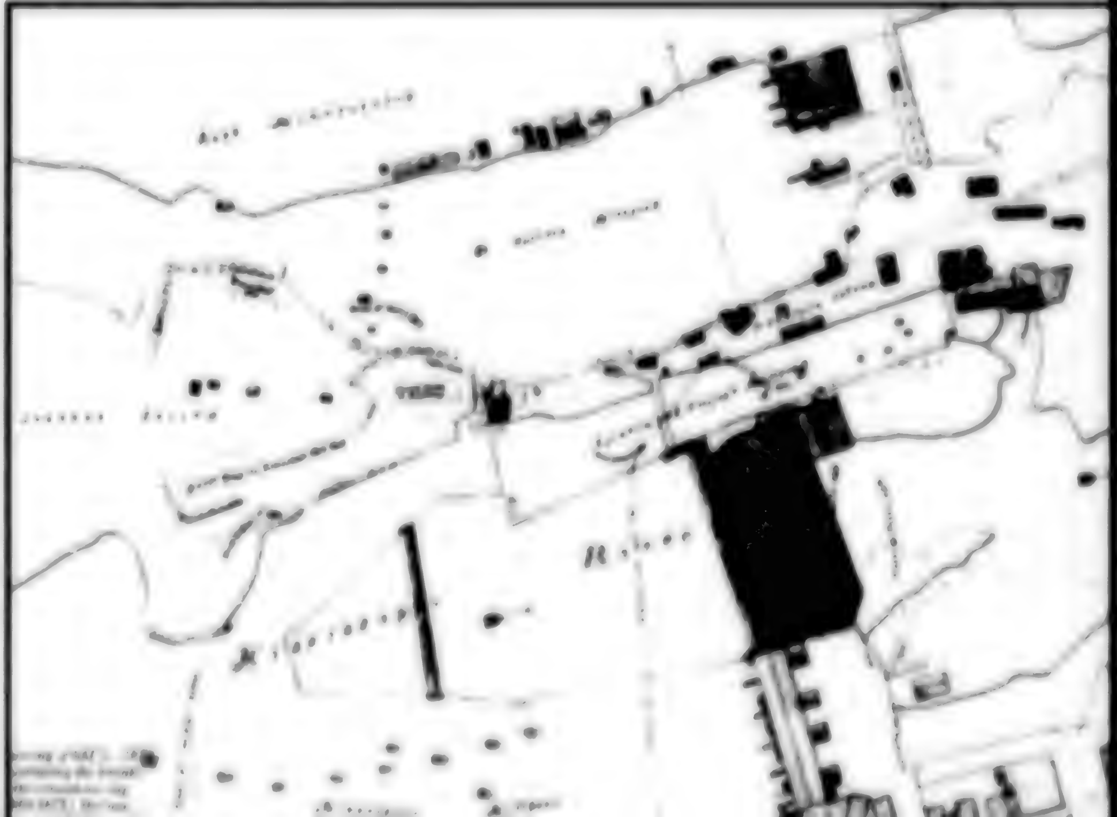


FIGURE 8. Eastman Tunnel disaster and repair work. St. Paul District.

Using steam gave the industry greater flexibility to choose where to mill their timber. It gave them the opportunity to acquire more land for lumber storage and better access to railroads on which to ship their finished products. Since the millers still needed to be near the Mississippi River, where boom companies captured their logs floating down from Minnesota's northern forests, they moved to north Minneapolis and founded a new milling center.

At the same time, flour millers began pushing for more of the falls' power. In 1876 the Minneapolis Mill Company decided not to renew the sawmill leases and by 1880 had bought out the sawmill owners. The company produced lumber for a while, but in 1887, removed the last two lumber mills. Also that year, fire again destroyed the east side sawmill row. By 1890 Bassett's sawmill, at the head of the canal, was the only sawmill on the west side. In 1895, however, Bassett's mill burned and with it went waterpowered lumber production at the falls. Begun in 1848, timber milling had lasted for almost 50 years.

By 1880 the new sawmilling center in north Minneapolis produced 12,608,000 board feet of lumber. Nine years later it supported eleven sawmills. And in 1899, the steam-powered mills of north Minneapolis would make the city the nation's leading sawmilling center for the next six years. But lumber production quickly declined thereafter. The great log drives ended a decade later and the logging era in Minnesota closed.

Flour

While lumber mills initially ruled the falls, flour would become its master. In 1849 Robert Smith had been granted a lease on the Fort Snelling mills, arguing specifically that he wanted to make flour. But Smith did little. So when Richard Rogers built a small grist and flour mill on the east side in 1851, it was an important event. The 12 bushels brought to the mill in 1851 yielded the "largest grist ever ground at the falls." For flour production to expand, however, grain production and the region's transportation system had to develop.

Like the lumber millers, flour producers had the river as their power source. But the similarities ended here. Lumber millers had a ready to harvest crop in the region's native forests, and they could rely on streams and rivers to deliver their raw material. Trees were an ancient crop, waiting, so the timber barons thought, to be harvested. Wheat and other cereals required that someone break the land, plant crops and harvest them, and get the product to St. Anthony. To the settlers rushing into Minnesota and the Dakotas wheat represented a quick cash crop, and they soon provided the grain needed to spur flour milling at St. Anthony. Despite the economic Panic of 1857 and the Civil War, wheat production in Minnesota climbed from about 1,400 bushels in 1850 to 2.2 million bushels in 1860 and soared to 18.9 million by 1870.

While the Mississippi and its tributaries provided the transportation system upon which loggers funneled their harvest to St. Anthony, farmers in western and southwestern Minnesota and the Dakotas needed a different and more reliable method to deliver their grain to the falls. The tremendous railroad expansion following the Civil War brought the immigrants needed to till the soil and the means to transport their crops to the millers.

Flour milling grew even faster than timber milling at the falls. In 1859 the Cataract Mill became the first commercial flour mill on the west side. Seven new mills, plus the old Fort Snelling mill, stood along the Minneapolis Mill Company's canal 12 years later. Chief among the new mills was C. C. Washburn's six-story mill, built of limestone along the west side canal in 1866. Four more flour mills operated on the east side. Drawing on the growing wheat harvests and railroad network, these mills helped boost Minnesota's flour production from 30,000 barrels in 1860 to 256,100 in 1869. (Figure 9.)

Despite this rapid growth of flour milling, the flour produced at St. Anthony Falls, while healthy, was considered inferior. Mills from other areas used soft winter wheat that yielded a fine, pure, white flour. Minnesota's spring wheat had a harder layer near the husk than winter wheat and

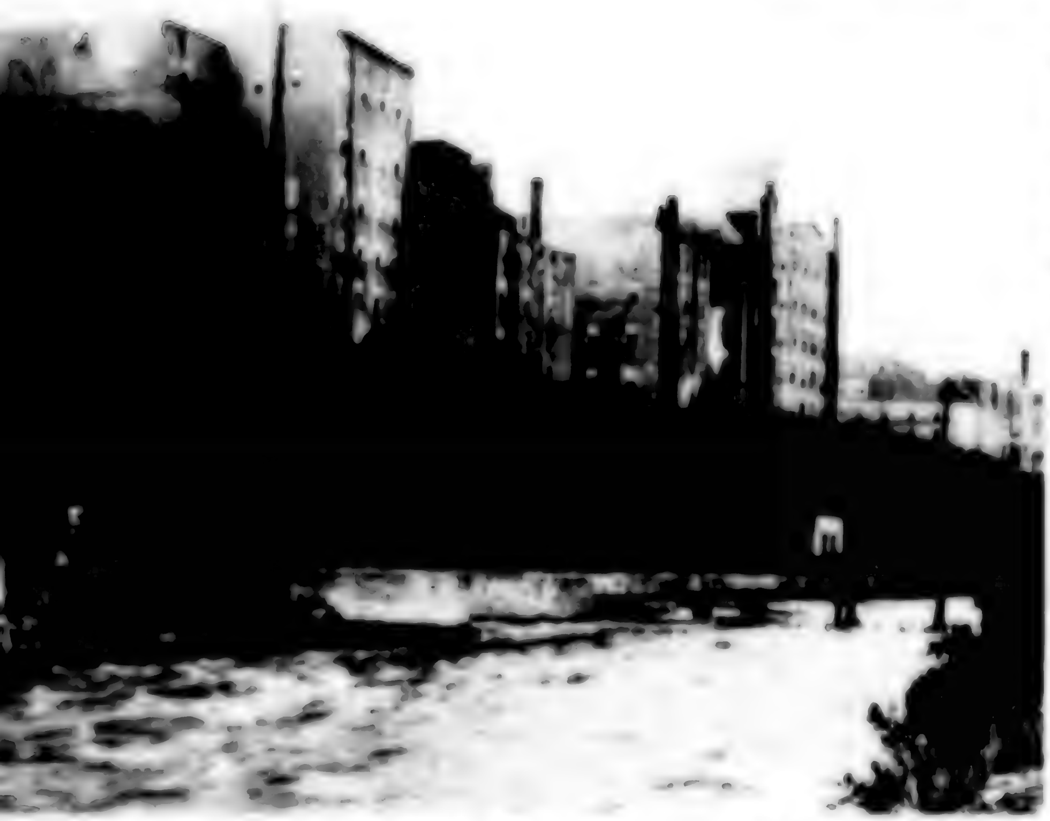


FIGURE 9. Flour mills along the west side canal, 1885. Minnesota Historical Society

required faster grinding. The high grinding speed produced so much heat that it browned the flour. Together, the hard inner layer and the bran formed a by-product the millers called the middlings. Millers often ground the middlings to make a second grade of flour, which, while nutritious, most bakers shunned.

During the 1860s, however, millers in southern Minnesota developed a new process that, when combined with the other factors favoring St. Anthony, would catapult its millers and its flour to national and international fame. The new technique relied on finer millstones that ran at a slower speed. This process generated less heat and did not discolor the flour. Also, the new method did not crush the husk and hard inner layer (or middlings) as much, so they could be separated more easily from the flour. Millers could then process the middlings to remove the bran. The resulting flour was fine and white and considered the best in the world for bread making. During the 1870s, the Minneapolis millers began using the new method and soon perfected it using porcelain and steel rollers, which did not leave specks in the flour.

By 1870 flour milling was ready to take off at the falls. Between 1870 and 1880, Minnesota's wheat production nearly doubled, from 18.9 million bushels to 34.6 million, and the millers moved quickly to use it. As of 1869 the west side canal had only eight mills along it, but between 1870 and 1876, millers crowded in ten new ones. Minneapolis was poised to surpass St. Louis as the nation's leading milling center. But on May 2, 1878, the Washburn A Mill exploded, killing 18 men. The explosion and ensuing fire destroyed "one third of the city's milling capacity, as well as lumberyards, planing mills, a machine shop, a wheat storage elevator, a railroad roundhouse, and a number of nearby residences." Undaunted, the millers quickly rebuilt the district. By the end of 1878, 17 mills produced flour on the west side, led by a new Washburn A Mill. In 1880, 22 flour mills stood on the west side.

On the east side, the growth of flour milling was limited by fires, the Eastman tunnel collapse and the lack of a waterpower canal. Millers had lost three mills on Hennepin Island. The Summit mill crumbled during a second cave-in of the tunnel, in 1870, and two years later the Island and

Farmers (River) mills burned. The St. Anthony mill burned in 1871. Compensating for these losses, millers built two new mills during the decade: the Phoenix and North Star. But the east side still lagged far behind the west.[61]

To get wheat, millers had to vie with other cities, including Milwaukee, St. Louis and Chicago. Competing mills sent agents throughout the Midwest to secure commitments from farmers for their grain. To counter this intrusion into what the Minneapolis millers saw as their hinterland, they initially formed a loosely organized buying pool and then, in 1876, formed the Minneapolis Millers Association. Copying their competitors, the pool sent agents into the countryside, oversaw the grading and pricing of wheat, and distributed the wheat among the mills.

While the pool increased the millers' control over wheat, it angered farmers. That anger flared during the Granger movement and led Ignatius Donnelly to challenge William Washburn for the U.S. Senate in 1878. What farmers saw as the association's abuses eventually gave rise to the Equity Cooperative Exchange, and the Equity gave rise to a farmers' cooperative movement that spread throughout the country.[62] The Equity established the nation's first terminal elevator built by a farmers' cooperative on the Mississippi's east bank in St. Paul.

As the flour millers organized to capture the region's grain, they also began consolidating their holdings at St. Anthony. By 1874 Charles A. Pillsbury and Company owned five mills and in 1879, Washburn, Crosby and Company owned three. With their eight mills, the two companies could produce over half of the city's flour.[63]

The consolidations, the Minneapolis Millers Association, the new mills, the middlings purifier, and the state's surging wheat production combined to make Minneapolis the nation's top milling city in 1880, a title it would not yield for 50 years. Between 1870 and 1880, the value of the flour millers' products rose from $1,125,215 to $20,502,305, contributing by 1880 "almost two thirds of Minneapolis' entire value in manufactures."[64] During the decade, flour production grew from 193,000 barrels annually to 2,051,840. Flour production helped boost the overall output from the falls to new levels.

The total value of goods produced by Minneapolis and St. Anthony in 1870 was $6.8 million. By 1880 this figure had jumped to almost $30 million. Overall, waterpowered mills contributed some three-quarters of the total value of goods. Together, lumber and flour directly employed 1,722 people. Adding the industries that emerged directly and indirectly from the two staples, the falls gave work to much of the city's population. As of 1880 Minneapolis ranked first in the nation in flour production, third in lumber, and twentieth in value of manufactured output. Its population had grown from 18,079 in 1870 to 46,887 and had surpassed St. Paul by more than 4,000. It had no equal north of St. Louis and west of Chicago to the Rocky Mountains. In the West, only Kansas City and San Francisco were bigger.[65]

Events during the 1880s ensured that St. Anthony Falls held and extended its lead as the nation's and sometimes the world's leading flour producer. Under pressure from the booming flour industry and taking advantage of the opportunities offered by steam power, the sawmills were leaving the falls by the decade's end, making more room for flour mills. Adding to the falls' flour output, the east side finally provided some competition for the west. Millers on the east side had been bridled by their failure to expand the direct use of waterpower. They had attempted to build a canal system like that on the west side, but had run into a cavern. Eastman had tried to bring direct waterpower to Nicollet Island and nearly destroyed the falls.

Success finally came in 1881. The year before, the St. Paul, Minneapolis, and Manitoba Railway Company, of which James J. Hill was a stockholder and general manager, bought the St. Anthony Company for $425,000. Also in 1880, the C. A. Pillsbury Company decided to build a huge new mill on the east side. To power it, the company had to overcome the geology that had prevented earlier attempts. Between 1880 and 1881, Pillsbury erected his Pillsbury A Mill and built a 450 foot long canal under Main Street to feed water to it. The limestone structure reached seven stories high and, for a short time, became the world's largest flour mill. The new mill produced almost twice as much flour as the Washburn A Mill and about one third the maximum flour output of the entire west side. While the Pillsbury A Mill's initial production equaled some 4,000 barrels per day, the complex grew to cover two blocks and its daily production reached 17,000 barrels per day, enough to yield a 56 mile long row of 25 pound flour sacks.[illegible]

While Hill hoped to make milling on the east side successful, his primary interest in acquiring the mill company was to connect the east and west sides with a railroad. To accomplish this, Hill built the Great Northern stone arch bridge, completing it in 1883. Two years later, he finished a depot to go with it. With his new bridge and railroad connection, Hill was able to deliver even more wheat to the milling district, and he left a monument that is a National Historic Engineering Landmark *(Figure 10)*.[illegible]

The trend in consolidation begun in the 1870s continued. In 1876, 17 companies had operated 20 mills in Minneapolis, but only four companies had produced 87 percent of the city's flour. In 1889, following a national trend to milling consolidation, the Pillsbury Washburn Company, the nation's first large milling corporation, bought out the Minneapolis Mill and St. Anthony companies. For the first time, the mills on the east and west sides came under unified ownership. By the early 1900s, three companies accounted for 97 percent of the city's flour output.[illegible]

Flour production at the falls continued to surge after Minneapolis became the nation's top flour producer. Flour production rose from about two million barrels in 1880 to just over six million in 1889, even though the number of mills declined from 25 to 22. But the millers increasingly turned to steam power and, soon, to hydroelectric power. Milling production grew from 13,694,895 barrels in 1908 to 18,541,650 in 1916. After 1916, however, production began to decline. "Milling in bond," made possible by the 1897 Dingley Tariff, allowed millers to important Canadian grain duty free, if they exported the flour made from it. Since millers along the eastern Great Lakes received Canadian grain by huge ships, they prospered more than those at St. Anthony. Increasing freight rates and outdated mill operations also hampered the millers at St. Anthony. By 1930 production at the falls dropped to 10,797,194, and Buffalo, New York, became the nation's leading producer, with just over 11 million bushels. By 1960 flour production at St. Anthony fell to 5,471,456 barrels.[illegible]

Hydroelectric Power

St. Anthony Falls gained national attention in 1880 as the country's leading flour producer, and two years later it again achieved national recognition. In 1882, as steam power allowed the lumber mills to move away from St. Anthony, and more and more flour mills switched to steam, the falls gave birth to a new power source, a source that would replace direct drive waterpower and steam. Electricity would allow the falls' power to flow well beyond the cataract. Even before businesses at the falls had access to hydroelectric power, they began using electricity. In 1881

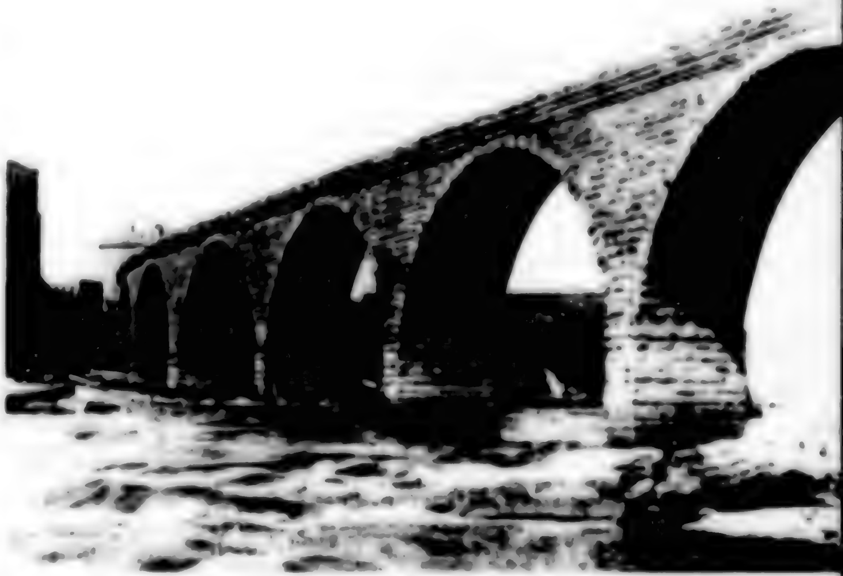


FIGURE 10. James J. Hill's Great Northern, Stone Arch Bridge, 1884.

Photo by Charles A. Tenney. Minnesota Historical Society.

the Pillsbury A Mill purchased an individual, electric power plant and installed lights, possibly becoming the first mill in the world to do so. But large scale hydroelectric generation from the falls would quickly replace the individual plants.

In 1881 William Washburn, Joel Bassett, Sumner Farnham, and James Lovejoy joined other Minneapolis businessmen (Otis A. Pray, Loren Fletcher, and C. M. Loring) to form the Minnesota Electric Light and Electric Motive Power Company, which they soon renamed the Minnesota Brush Electric Company. They acquired land on Upton Island from Dorilus Morrison and built a small central power station with five Brush arc light generators (*Figure 11*). They ran lines to bars and businesses on Washington Avenue and on the evening of September 5, 1882, lit them with electricity generated by the first hydroelectric power central station in the United States. Given the spread and impact of hydroelectric power central stations on the economy and environment of the country, this was a nationally significant event.[7]

As the Minnesota Brush Electric Company began generating electric power, it tried to expand the number of users. One of the company's first goals was to provide street lighting for Minneapolis. To do this, they had to prove that electric lighting worked, and they had to overcome the opposition of the gas light providers, who were not willing to step aside. To demonstrate the effectiveness of electric lighting, the company erected a 257 foot tower, called the mast, at Bridge Square and suspended eight arc lamps from it. On February 28, 1883, as hundreds of people watched, the company turned the lamps on. This demonstration and another a few days later convinced many that electricity would replace gas. By the end of 1885, 232 electric street lamps glowed in Minneapolis.[8]

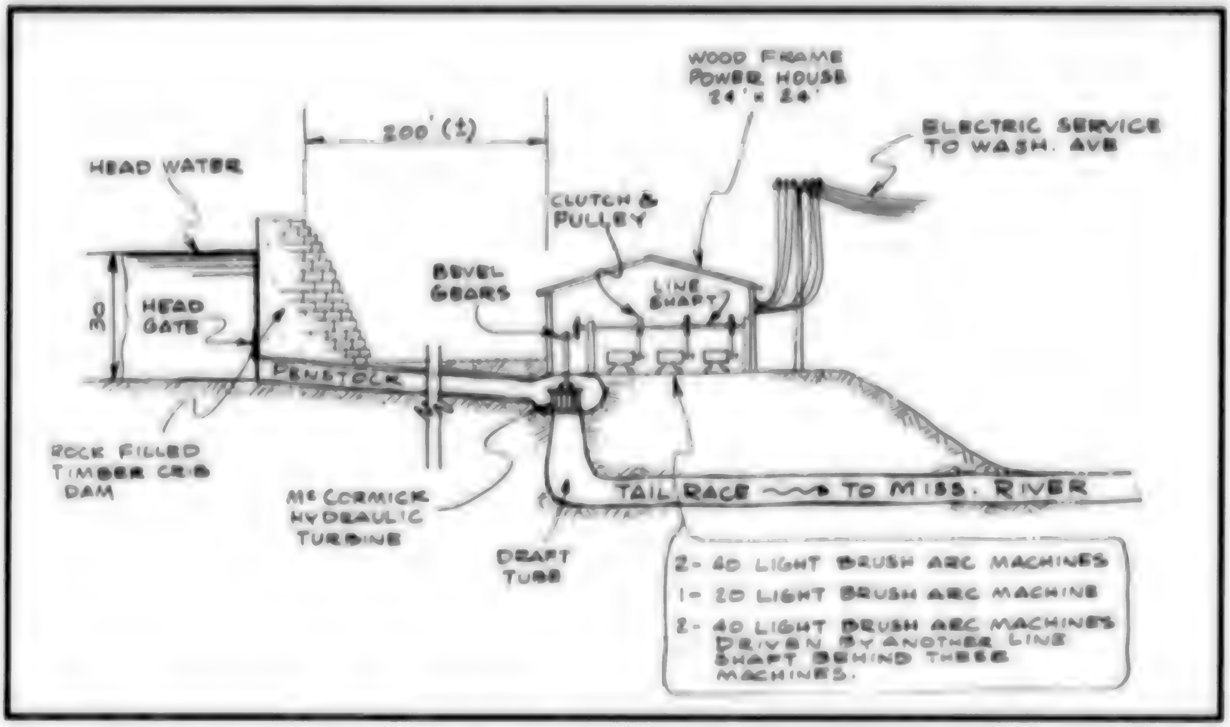

WOOD FRAME POWER HOUSE 24' x 24'
ELECTRIC SERVICE TO WASH. AVE
200' (±)
HEAD WATER
CLUTCH & PULLEY
BEVEL GEARS
LINE SHAFT
30'
HEAD GATE
PENSTOCK
ROCK FILLED TIMBER CRIB DAM
McCORMICK HYDRAULIC TURBINE
TAIL RACE ~~> TO MISS. RIVER
DRAFT TUBE
2- 40 LIGHT BRUSH ARC MACHINES
1- 20 LIGHT BRUSH ARC MACHINE
2- 40 LIGHT BRUSH ARC MACHINES DRIVEN BY ANOTHER LINE SHAFT BEHIND THESE MACHINES.

FIGURE 11. The first commercial hydroelectric central plant in the country, 1882. St. Paul District, Corps of Engineers.

Locally the Minnesota Brush Electric Company demonstrated the potential of hydroelectricity. And in 1894, when the Niagara Falls hydroelectric power plant went on line, it showed Americans that hydroelectricity was more than a curiosity; it had come of age.[9] By the turn of the century, hydroelectric power companies perfected their ability to transmit electricity over long distances.

spurring the spread of hydroelectric plants.

St. Anthony Falls stayed at the forefront of hydroelectric power generation. In 1894 the Pillsbury Washburn Company leased 20 mill powers to the Minneapolis General Electric Company, and over the next two years, the company built its Main Street Station. And in1895, William de la Barre, the genius behind the development of waterpower at St. Anthony Falls, began building the Lower Dam and Hydropower Station, about 2,200 feet below the falls. As the project took shape, some chided it as "De la Barre's Folly." But once it was completed, Charles Pillsbury claimed it was one of the "'greatest engineering feats of the present century.'" The *Electrical Engineer* suggested that "'in scope and character,' only the Niagra facility surpassed it. The new power station provided electricity to the streetcars of the Twin City Rapid Transit Company. De la Barre also convinced the Pillsbury Washburn Company to let him build the Hennepin Island Plant near the Main Street Station, between 1906 and 1908.

De la Barre had come to Minneapolis in 1878 and was hired by the Minneapolis Mill Company in 1883 *(Figure 12)*. Until he died in 1936, he made extracting the falls' maximum power potential his passion. At Franklin Steele's original dam, the head the distance the water fell from above the dam to below it totaled only eight feet. By 1889 de la Barre had elevated the average head to 36 feet and later raised it to 15 feet.

Under de la Barre's direction, the working capacity of turbines at the falls increased from 13,000 horsepower in the 1880s to 55,068 horsepower by 1908. Overall, the hydroelectric plants accounted for about 25,000 horsepower, the flour mills another 24,000 and the City of Minneapolis, North Star Woolen Mills Company, and others the remainder. In 1923 Northern States Power bought the hydroelectric power company firms from Pillsbury Flour Mills. By 1960, when construction on the Upper St. Anthony Falls Lock and Dam cut off the west side water power canal, all the mills at St. Anthony Falls had shifted from direct hydropower to hydroelectricity.

Other Industries

Many other industries grew up at the falls, either feeding off the mills or trying to employ the waterpower towards ends other than timber and flour milling or hydroelectric power. Foundries and machine shops repaired and constructed railroad cars and engines, made steam engines, ornamental iron, farm implements, and milling equipment. Others hoped to produce paper at the falls. A paper mill was among the earliest industries to tap the falls' power. Built on Nicollet Island in 1859, the mill initially produced much of Minnesota's printing paper. Another paper mill

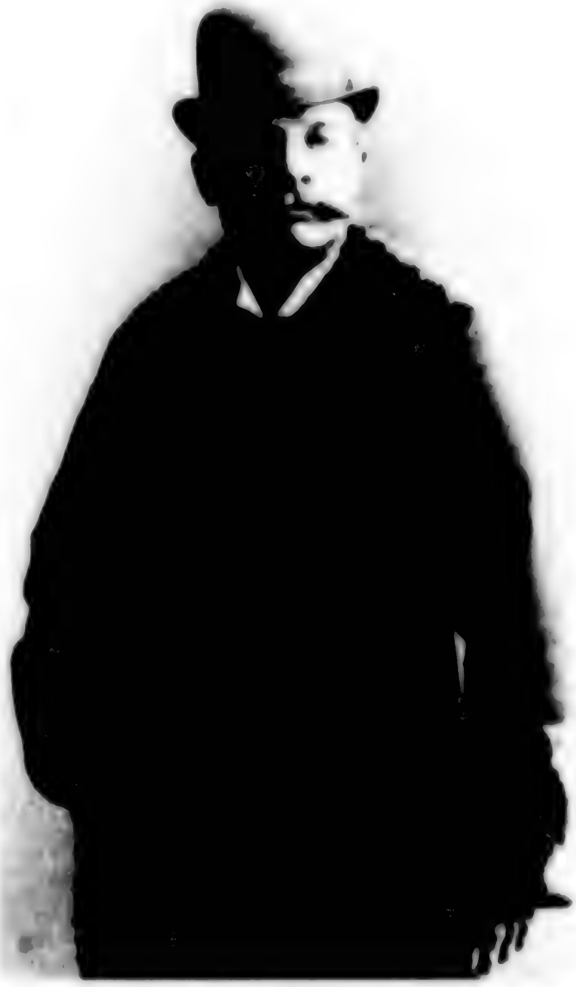


FIGURE 12. William de la Barre, the mastermind of hydropower development at St. Anthony Falls. Kane, The Falls of St. Anthony.

was established on the west side in 1866-1867. Iron and paper industries, however, failed to grow at the falls.

Some entrepreneurs, hoping to recreate New England's success, had looked to Lowell and other northeastern milling centers as their model, not only for the west side's production system but for the commodities they should produce. Like New England, they expected the falls to support a booming textile industry. They thought it only natural that Southern cotton should move up the Mississippi River and their finished products would move down it. By the mid-1860s two textile mills manufactured flannel, cassimere, scarves and yarn. Two carding mills opened during the same time, one on each side. In 1870 Dorilus Morrison joined other business interests to build the Minneapolis Cotton Manufacturing Company. At first it produced only seamless flour bags but moved into wagon covers, duck for tents, and awnings. In 1881, however, the mill closed.[77]

Despite expectations, only one textile mill prospered at St. Anthony Falls: the North Star Woolen Mill, which W. W. Eastman and Paris Gibson founded in 1864. Although it went bankrupt in 1876, the Minneapolis Mill Company bought it, and it subsequently produced textiles up to the 1940s. The mill produced cassimere, flannel, scarves, and yarn, but became renowned for its blankets. At the 1876 Centennial Exposition in Philadelphia, the company won the highest prize for product quality.[78]

Summary

From ancient times when Native Americans frequented St. Anthony Falls for reasons we can only guess, to today, the falls has been a geologic marvel and a geographic landmark. It has attracted those who sought the blessing of its spirits, the majesty of its natural beauty, and the energy of its falling waters. If the historic accounts provide any indication, its natural beauty and power made it a place of deep spirituality for Native Americans of many different tribes for thousands of years. The same beauty and power made the falls a national and international attraction, the destination of writers, painters and tourists. That energy gave St. Anthony national recognition and international fame for its timber, flour and hydroelectric production. While the falls is still important for its energy, more and more people are returning to admire its power in other ways, ways more akin to much earlier times. This has only become possible since milling at the falls died and opened the falls to new uses.

Minneapolis not only lost its title as the nation's flour capital in 1930, it began removing many of the mills that had made it famous. In 1931 alone, at least seven mills came down, followed by several more during the decade.

By 1956 only the Pillsbury A Mill remained on the east side, and the company blocked off the headrace, which had been so hard to get, and shifted the mill to hydroelectric power.

As the Corps completed work on the Lower and Upper St. Anthony Falls Locks and Dams (fulfilling Minneapolis' vision of becoming the head of navigation), more of the mill district's historic fabric disappeared. To build the lower lock and dam, the Corps had to remove the 1897 dam built for the lower hydropower station by de la Barre. In 1960 the Corps filled the west side canal, and the gatehouse at its head was taken down. In 1965 the Washburn A Mill produced its last flour and ended flour production on the west side. As part of its construction of the upper lock, the Corps filled over the old tailraces that had run from the mills along the canal to the river. (With the city's development of Mill Ruins Park, the mill races have again been exposed.) As "urban renewal" took hold in the 1950s and 1960s, more of the west side mills were torn down. The sixties also brought the birth and growth of historic preservation. Without an active milling industry and with a new interest in the falls, the opportunities to get near the cataract and interpret its history are now being realized.[19] *(Figure 13.)*

FIGURE 13. Rediscovering the roots. Mill Ruins Park, Minneapolis.

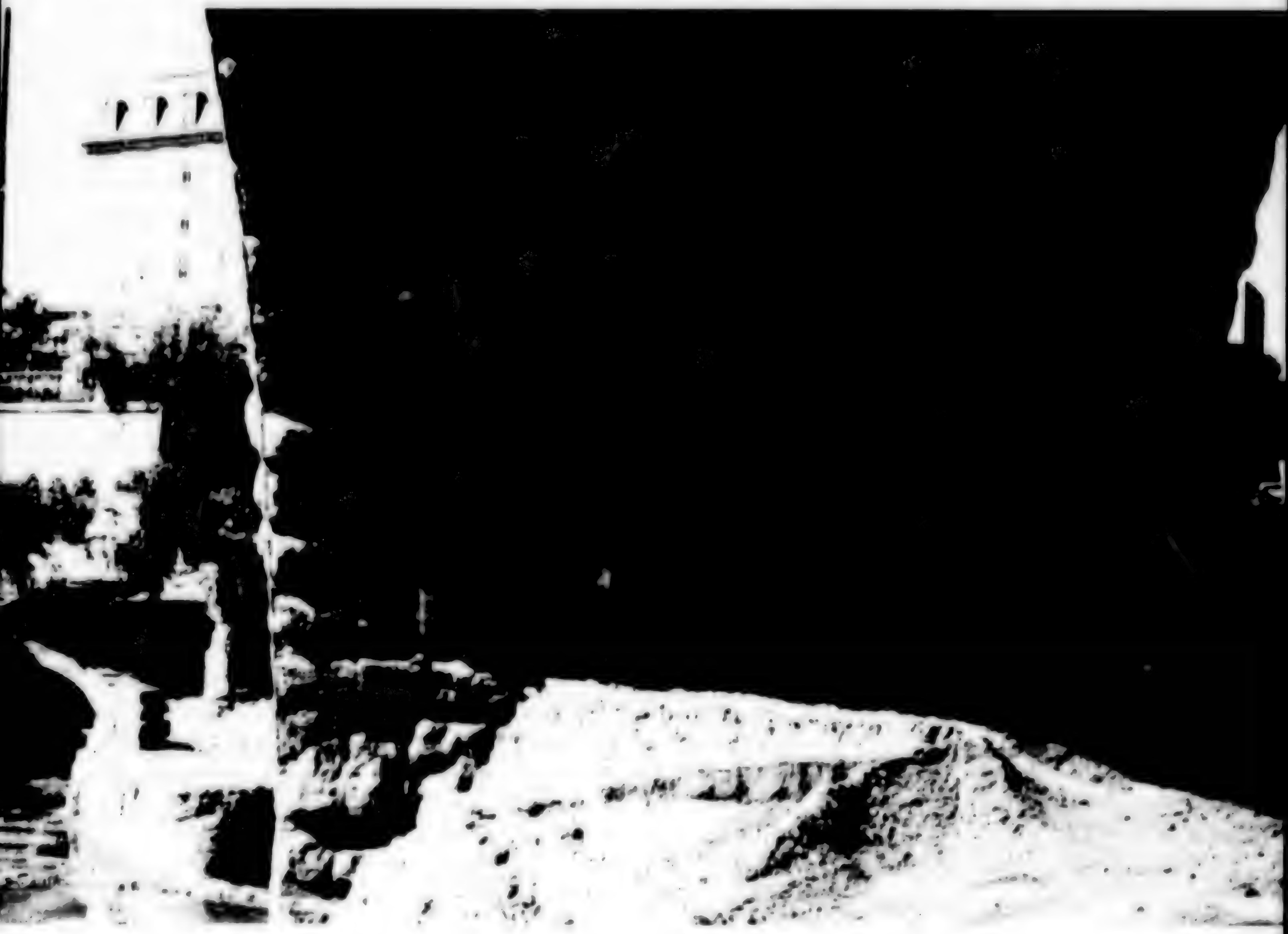


FIGURE [illegible]. Commerce and transportation on the modern Mississippi River in St. Paul

Chapter 7

The Patterns of Agriculture, Commerce, Industry and Transportation

From canoes carrying furs to steel barges bearing the grain of multinational corporations, economic activities and transportation systems have shaped the MNRRA corridor. They have defined the pace and scope of change to the valley's landscape and ecosystems. They have defined how people see and relate to the river. They have done so, however, within the framework of ancient landforms. Geology dictated that St. Paul began as the head of navigation and that St. Anthony Falls gave rise to the mills of Minneapolis. The floodplain valley from the Minnesota River's mouth to Ravenna Township, the confining gorge between the Minnesota River and St. Anthony, and the prairie river above St. Anthony encouraged or restricted business and transportation. The MNRRA corridor's history and the significance of historic sites tied to business and transportation must be understood, then, as the integration of human and nonhuman factors. (Figure 1)

This chapter provides an overview of the MNRRA corridor's economic and transportation history, other than navigation improvements, from the end of the fur trade to the 1950s. Roads, railroads, bridges and highways and the corridor's economic development are inseparably tied. Transportation systems have often determined the relationship of communities to the river. As canoes and steamboats drew people to the river, roads and railroads pulled them away. This chapter illustrates processes critical to the birth and growth of the corridor's communities.

Business Development

Sites representing commerce and industry in the MNRRA corridor are of at least three distinct types: those directly tied to the Mississippi River, those related to businesses with direct ties, and those unrelated to the river. Sites in the first two categories characterized the river during the nineteenth and early twentieth centuries. During the late nineteenth century and especially during the early twentieth century, sites located along the river had less and less direct or indirect relation to it.

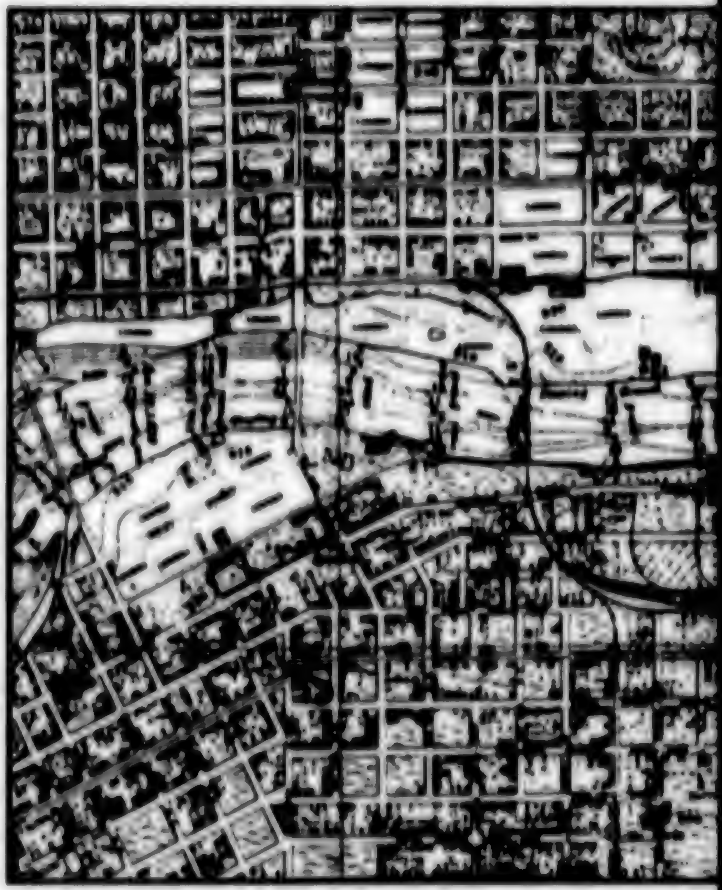
Economic development sometimes linked the MNRRA corridor's cities and at other times separated them. For example, fur trading gave cities from Hastings to Dayton a common river heritage. As cities relied less on the river, however, their economic histories diverged. Changes in the transportation systems were in part responsible, for transportation often determined the nature of commercial development and the relation of that development to the river. Railroads used the river valley's flat grade at St. Paul and below for their tracks and in doing so enticed businesses to the valley. Those businesses, however, focused on railroads, not the river. The river did retain one important economic function. It offered a way to dispose of wastes quickly and cheaply, which drew some industries to its banks.

Timber • Lumber milling replaced the fur trade as a key economic core around which many communities developed. Like the fur trade, timber milling created a shared historical context for cities in the MNRRA corridor. Most settlements had at least one lumber mill. The story of these mills and their role in building the river's communities is often overshadowed by milling at St. Anthony Falls.

Lumber millers depended on the river and its tributaries to deliver logs and to power their mills. Some located facilities near the mouth of small tributaries, where they built dams to capture the hydropower. The Rum River at Anoka, Rice Creek in Fridley, Elm Creek in Champlin, Shingle Creek in Minneapolis, and the Vermillion River in Hastings all had mills. Most acquired their first mills during the 1850s and 1860s. Dayton (1856), Anoka (1854), Champlin (1867), Brooklyn (1859-60), St. Paul (1845, 1850), Nininger (1854, 1856 and 1857) and Hastings (1855) all boasted sawmills during their early years. While most of these mills succumbed to fire, they were so important that they were quickly rebuilt.

Timber milling was vital to most communities emerging along the river during the mid to late nineteenth century. The mills employed hundreds of people in gathering, sorting, sawing and finishing logs into boards, shingles, and other products. "Logging and river driving gave employment to the male population of Anoka and Ramsey for many years," writes Jean James in her booklet, *The history of Ramsey.* In 1872, W. D. Washburn & Co. built a large steam sawmill in Anoka that employed 125 men. In addition to their own milling operations, communities throughout the corridor witnessed the annual herding of logs down the Mississippi and its tributaries. *(Figure 2)*

The lumber cut at these mills spurred other businesses and construction booms in many of the corridor's communities. Lumber had immediate and demanding local markets. In 1854 in Anoka, says Albert Goodrich, "Nobody waited for lumber to dry, and the man who could get green boards or slabs enough to build a shanty before cold weather set in counted himself lucky."



By the late 1800s, many small lumber mills had closed and north Minneapolis was growing into the nation's leading lumber producer. The Mississippi River Commission (MRC) maps, the most detailed maps made of the river in the nineteenth century, illustrate the importance of timber from St. Anthony Falls to north Minneapolis. Beginning at river mile 866, or immediately below where the Coon Rapids Dam is now, an 1898 MRC map shows a lumber boom projecting upstream from an island (Island 215 on the map). Not quite two river miles downstream, another boom points upstream from Little Casey Island (now part of Banfill Island). By river mile 864, just above the head of Durnham Island in Brooklyn Center, the number of booms and cribs used to direct and sort timber becomes continuous down to St. Anthony Falls. Just above Minneapolis, multiple crib and boom systems line the river, four or five next to each other at times.

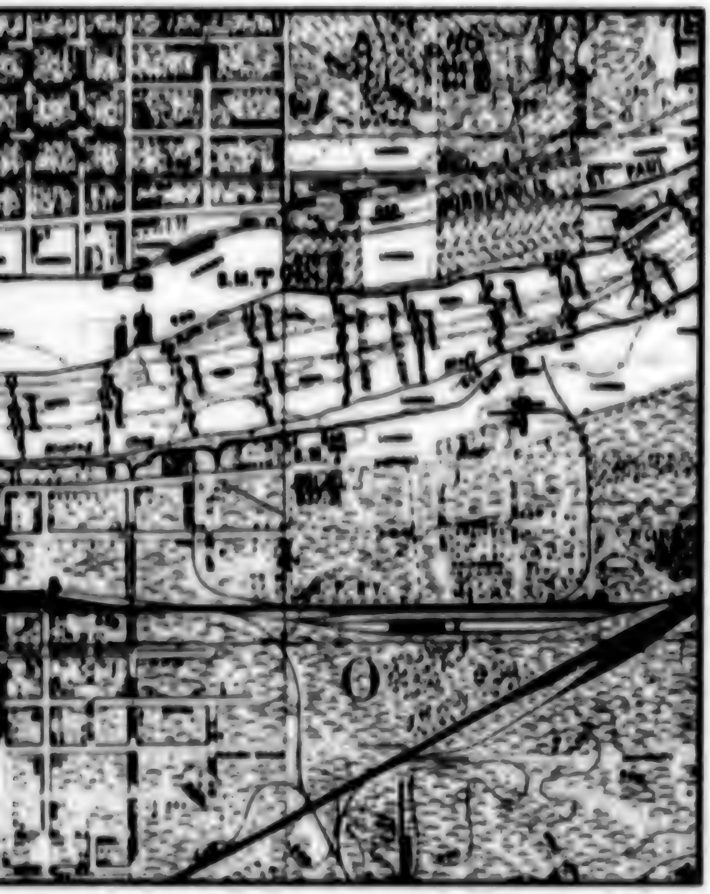


FIGURE 2. The lumber industry in Minneapolis. Mississippi River Commission Map, 1895. Note lumber yards and log booms above St. Anthony Falls. St. Paul District, Corps of Engineers.

Lumber mills and yards dominate the Mississippi's east and, especially, west banks from St. Anthony Falls north to near the Minneapolis city limits. The MRC maps clearly show the extent to which lumber had become king in north Minneapolis by the mid 1890s.[7] *(Figure 2)*

Cities below Minneapolis also supported sawmills. William Dugas built the first sawmill in St. Paul in 1844, although it did not begin operating until 1845, three years ahead of Franklin Steele's mill at St. Anthony Falls. Dugas, for some reason, could not find enough customers and had a difficult time getting logs. For these reasons his mill failed within the year. On November 14, 1850, the state's first steam sawmill began operating at St. Paul's lower landing. And when John S. Prince came to St. Paul in 1854 to manage the properties of Pierre Chouteau, Jr. & Co. fur trading company, the holdings included the Rotary Mill. Prince ran the mill until it burned on May 22, 1868. St. Paul's mills generally served the local market and were gone by the turn of the century.[8]

Further downriver, Nininger and Hastings drew on the pineries of northern Minnesota and the maple basswood forest known as the Big Woods. Hastings also had the Vermillion River, which provided hydropower for milling. The first lumber mill at Hastings was built in 1855. Like the mills at the northern end, the mills at Hastings produced or supplied other companies with the lumber to make shingles, sashes, doors, blinds, furniture, wagons and carriages. By providing the lumber for construction and other industries, Hastings' sawmills, like those in St. Paul, Minneapolis and above, established an important economic base for the city.[9]

Quarries, Bricks and Lime Kilns • Lumber was not the only building material supported or supplied by the Mississippi. The valley's limestone bluffs, gravel beds, and clay deposits attracted millers, construction companies and the Corps of Engineers. Early millers at St. Anthony quarried limestone from Spirit Island and other islands at the falls to build their mills. They also mined it from the bluffs around the

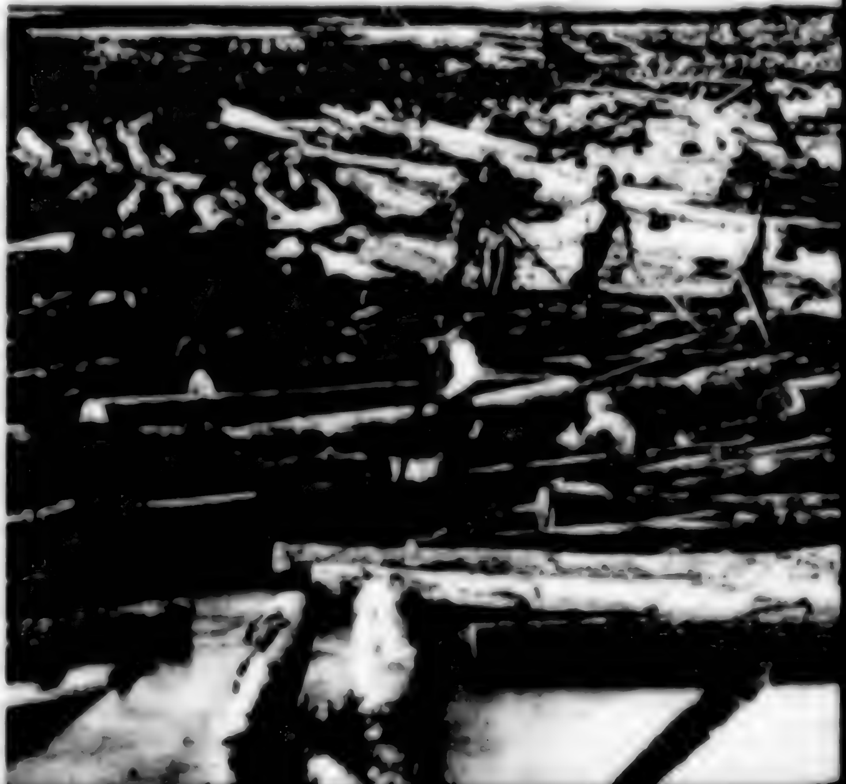


FIGURE 3. Log drivers sort out a log jam above St. Anthony Falls, 1881. Photo by Michael Nowack. Minnesota Historical Society.

falls. The Corps quarried the bluffs for rock to build wing dams and to armor the river's banks. Corps draftsman and photographer Henry Bosse photographed one such quarry near Cherokee Heights, across from downtown St. Paul *(Figure 4)*, and another at Riverside Park in Minneapolis. The 1895 MRC chart for Minneapolis shows at least 13 quarries between St. Anthony Falls and the Lake Street Bridge. Construction companies mined the bluffs, islands and floodplain from above St. Anthony to Hastings for rock and gravel. Although the quarried bluffs may appear natural today, they represent an important way in which humans have sculpted the landscape of the Mississippi River valley through the Twin Cities.[10]

Throughout the river valley, clay deposits presented the opportunity for brick making. Fires, which nearly all the MNRRA corridor's communities experienced during the late nineteenth century, spurred the creation of brick companies. When a fire destroyed a large part of Anoka in 1884, brick, as a fireproof material, became popular. Just downstream, Coon Rapids became a busy brickmaking town. Several brick companies had opened around Coon Rapids before the fire, and at least three brickyards eventually located on Coon Creek in Coon Rapids. All three lay just outside the corridor, but as with many brickyards, they influenced construction within the corridor. Many buildings in the northern corridor are or were undoubtedly made of bricks produced at these yards. One brick plant, the Minnesota Clay Company, had 72 acres of clay deposits and a pit more than 130 feet deep. "This brick plant," claims local historian Leslie Gillund, "was one of the most modern and well-equipped in the country. . . ."[11] *(Figure 5)*

Other cities in the corridor had brickyards as well. Edward Neill, in his history of Hennepin County, noted that "brick clay" lay along the river in north Minneapolis. In 1876 Morrison's brickyard began using this clay.

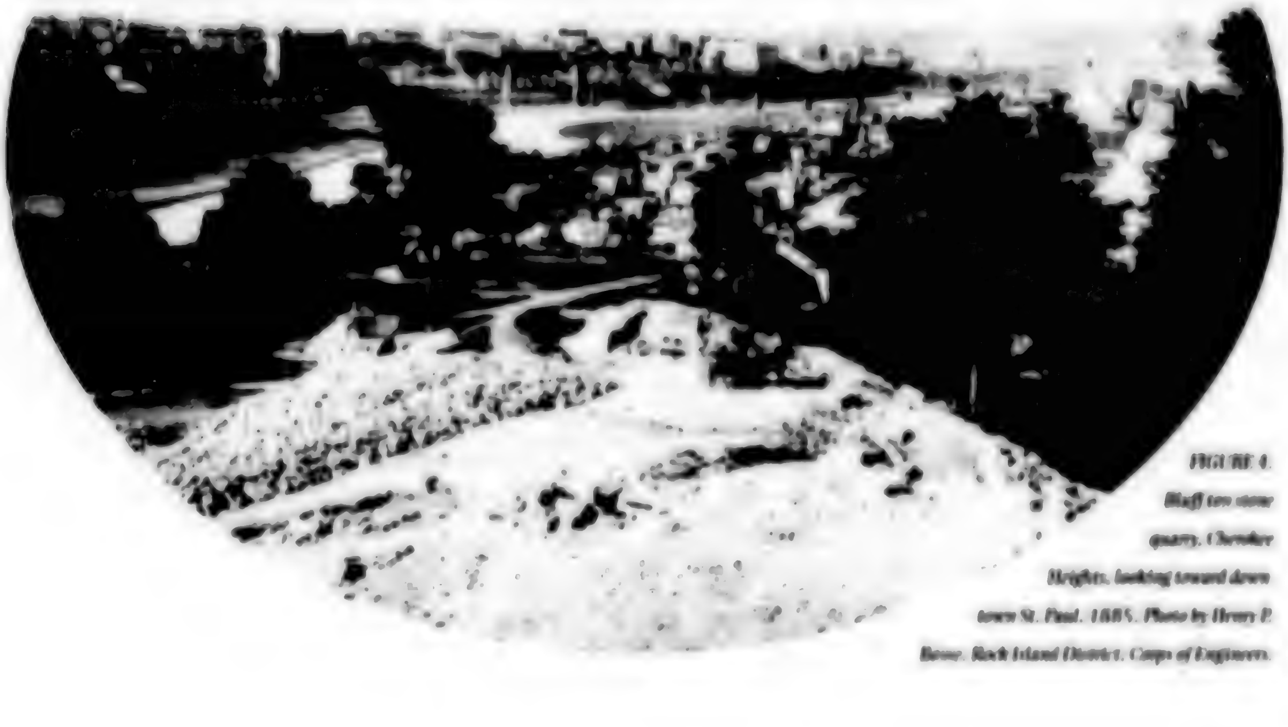


FIGURE 4. Bluff toe stone quarry, Cherokee Heights, looking toward downtown St. Paul, 1885. Photo by Henry P. Bosse. Rock Island District, Corps of Engineers.

FIGURE 5. Baking bricks. Frank A. Johnson brickyard, Fifteenth and Lyndale, Minneapolis, near the Mississippi River, 1904. Minnesota Historical Society.

employing about 20 men and four mills to grind it. The company produced 1.8 million bricks in 1880, most of which went to Minneapolis. Another brickyard, run by Johnson and Berg, also employed about 20 men and had four mills for grinding the clay. This yard and the others made a light colored brick which, Neill reports, was typical of the area. Weithoff's brickyard, the third in north Minneapolis, had only two machines and eight men and turned out about 600,000 bricks annually. In St. Paul, the Twin City Brick company used clay from Pickerel Lake, in the Mississippi River's floodplain, during the first half of the 20th century. Hastings also possessed clay deposits and brickyards. You can still see evidence of these operations in the old brick homes and businesses in the corridor's communities.

The Grey Cloud Lime Kiln represents a rare type of industrial site associated with building materials and agriculture. Located on the Grey Cloud Channel, in a Mississippi backwater, this National Register site is, according to Cottage Grove historian Robert Vogel, "a kind of industrial fossil that provides us with important clues as to early settlement and development in the Grey Cloud area, where limestone quarrying has played a small but important part in the local economy since the middle of the 19th century."[illegible] Used from about 1873 to 1902, the kiln burned limestone to yield quicklime, which builders used as mortar and farmers used for fertilizer. Vogel believes that most of the kiln's output went for fertilizer. Measuring some 20 feet square at its base, the kiln stood about 35 feet high and had walls four feet thick. Wood for the kiln's furnace came from the surrounding river bottoms and uplands. The bluffs supplied the limestone. Vogel thinks that the reservoir created by Lock and Dam No. 2 has flooded some of the old quarries, but others could lie near the kiln. More limestone kilns probably existed in the MNRRA corridor, but we know almost nothing about them. As the Grey Cloud Lime Kiln shows, such kilns contributed to changes in the Mississippi's landscape, by quarrying the bluffs and taking trees from the bottomlands and bluffs. Demand for fertilizer from the kiln tells us something about early agricultural methods.

Agriculture • Agriculture and related activities quickly joined lumber milling as the foundation of economic growth in the MNRRA corridor. The Minnesota Historical Society divides its context statement for agriculture into two periods. (The Historical Society's context statements serve as a basis for evaluating the National Register significance of potentially historic sites.) The first period, called "Early Agriculture and River Settlement," lasted from 1840 to 1870. The Treaties of 1837, 1851 and 1855 with the Dakota and Ojibwa officially opened Minnesota to settlement and agriculture. The creation of the Minnesota Territory in 1849, statehood in 1858, and the Homestead Act of 1862 spurred both. The Historical Society context statement says that agriculture during this period was primarily for subsistence, although wheat was becoming a cash crop. Most communities at this time lay along rivers. "Many of the towns became centers for agricultural product processing facilities, such as flour and sorghum mills and breweries, typically small operations that catered to a local market." The Historical Society's context statement is generally true for the MNRRA corridor, but in many ways, communities in the corridor were ahead of the rest of the state.

The Minnesota Historical Society defines the second period of agriculture as "Railroads and Agricultural Development (1870–1940)." The production, transportation, and processing of agricultural products characterized this period. Family farms were the typical unit of production. Towns that lay along railroads became shipping points and supply and service centers for surrounding agricultural communities. Grain elevators, processing facilities, warehouses, the grain exchange, flour milling, and brewing grew from the focus on agriculture. Flour milling and brewing fostered many small companies, some of which blossomed into national giants. All the corridor's early communities supported businesses dependent upon agriculture. Some were part of industries that occurred throughout the corridor and others were unique to one or two communities.

Although the Historical Society's context statement suggests that pioneer farmers in Minnesota focused on subsistence farming from 1840 to 1870, this was not always so in the MNRRA corridor, where many farmers moved quickly from subsistence farming to producing for local, regional and national markets. As they did, they experimented with a variety of crops, livestock production and dairy farming.

Jean Baptiste Faribault, a trader who had located above St. Paul by 1805, became the first to grow wheat in Minnesota, when he planted it on an island at the confluence of the Minnesota and Mississippi Rivers. Not until the late 1850s, however, would wheat take off. Despite the Economic Panic of 1857 and the Civil War, the wheat harvest in Minnesota climbed from about 1,400 bushels in 1850 to 2.2 million bushels in 1860 and jumped to 18.9 million in 1870. Between 1870 and 1880, Minnesota's wheat crop nearly doubled, from 18.9 million bushels to 34.6 million. A drop in wheat prices after 1877, however, led farmers to diversify. They tried new crops, livestock production and dairy farming. The new crops and other agricultural activities spurred more new businesses.

Early farmers experimented with a variety of crops and livestock. In 1847 William Noot, one of the first pioneers in Anoka County, settled just below Kings Island, about a mile above the Rum River's mouth. Shortly after, he planted corn and beans on the island. About the same time, a Captain Folsom bought the Rum River fur trade post and grew the first potato crop. Showing that a farmer could reap a great profit on the frontier, Folsom cut enough hay in 1848 to make about $6,000. He sold it to the owners of horse or oxcart teams that brought supplies to the Winnebago, whom the U.S. government had relocated to Long Prairie. In about 1854, another early settler, James C. Frost, milked the first cow in Anoka. Since milk was such a rarity, he shared it with his neighbors.

Wheat became the dominant crop in Anoka County before the Economic Panic of 1857, after which wheat prices plummeted, forcing farmers to raise other crops and livestock. In 1859 potatoes and corn became most important, and, according to Albert Goodrich, in his history of Anoka County, the high prices for wool convinced many farmers to raise sheep the next year. Wool production and potato harvests in Anoka County grew between 1860 and 1870. When potatoes suffered from the Colorado beetle or potato bug in 1866 and for the next couple of years, the potato crop declined. In response, farmers began what was probably the first use of pesticides in the county. They applied a substance called "Paris Green." While it worked, many feared it poisoned the potatoes. By 1879, despite the beetles and the pesticide, the county's potato harvest had grown to 68,000 bushels. While high, this was well behind the 121,000 bushels of corn and 94,000 bushels of wheat harvested in the county. As the depression that had begun in 1877 receded, farmers returned to wheat.[18]

Potato production received a boost in the mid 1880s when Reuel L. Hall opened a potato starch factory on the Rum River in Anoka. In 1886, after failing to get eastern starch makers interested in his venture, Hall joined with a "monied friend," C. E. Leland, to build the largest potato starch factory in the United States and the first west of the Mississippi River. Despite the county's large potato crop, it was nowhere near enough for the huge factory, which remained largely unused for two years. After the third year, however, potato output increased, and the plant went into full production. The potato harvest in Anoka County leaped from the 68,000 bushels in 1879 to 171,000 in 1889 and 717,000 in 1899. Hall went on to build plants in Monticello, North Branch and Harris, Minnesota. His success, Goodrich contends, led to the building of some 20 potato starch plants west of the Mississippi by the early twentieth century. One of these factories, the Diamond Starch Company, opened in Hastings in a former warehouse near the waterfront and produced starch from 1889 to 1898. Goodrich notes that Anoka County potatoes became known for their eating quality and were shipped to every state in the union.[19]

Cottage Grove and Hastings prospered from their agricultural activities also. As early as 1855, Cottage Grove had some 20 to 30 farms. The primary crop, as in Anoka County and wherever settlers had begun tilling the land, became wheat. From the 1840s to the 1870s, wheat dominated. When wheat prices fell after 1877, farmers around Cottage Grove turned to corn, soybeans, raising cattle and horses, and dairy farming.[20]

Cottage Grove historian Robert Vogel makes an important point about dairy farming. It grew after 1880, he observes, because farmers in Cottage Grove were near the Twin Cities, the largest market for dairy products in the region. So, as the nonagricultural population grew, the demand for farm products, especially products that could spoil quickly, increased dramatically in the immediate area, allowing farmers near and within Minneapolis and St. Paul to specialize.[21]

Farming also began around Hastings in the early 1850s. Wheat and other grains became important to Hastings' economy for at least two reasons: flour milling and shipping. The storage, handling, and processing of grain has been "a constant activity along Hastings' river frontage since the 1850s," says Carole Zellie, in her study of historic contexts for Hastings.[22] The post built by Alexis and Henry Bailly in 1853 began this history, as it became a warehouse to store goods, including sacked grain, for shipping on steamboats. During the next decade, entrepreneurs in Hastings built many more warehouses to accommodate the region's booming grain production. By 1859 Hastings ranked second only to Winona in wheat shipping. In 1863 warehouses in Hastings stored some 500,000 bushels of wheat. Hastings drew on a hinterland that extended 60 miles to the west, and early farmers in this region brought their grain by oxcart to the river town for distribution to local, regional and national markets. When railroads entered Hastings in 1868, they built grain elevators to capture the shipping of agricultural products.[31]

Farmers around Hastings, as in other communities, had to diversify due to cyclical economic depressions. By the 1870s and 1880s cattle raising and dairy farming had become important. Local entrepreneurs soon built creameries, like the Golden Star Creamery near Hastings' levee, to make butter, cheese and ice cream.

St. Paul and Minneapolis, of course, also became important grain processing and handling centers. The stories of these businesses in the two cities are discussed extensively in Chapters 4 and 5 on navigation, in Chapter 6 on flour milling at St. Anthony Falls, and in the account of railroad expansion later in this chapter.

The 1895 and 1898 Mississippi River Commission (MRC) maps for the corridor provide a snapshot of farming in the corridor at the end of the nineteenth century. Although no one has found the key to the MRC maps, hatch marks indicate where agricultural fields lay. Farmers planted up to the river from Dayton down to the northern limits of Minneapolis. From the north Minneapolis lumberyards to the Lake Street Bridge, urban development had taken over. Land below the Lake Street Bridge down to Lilydale (the upriver edge of St. Paul's urban growth) was more rural, and farms tended to be farther back from the bluff edge. Pike Island and some of the floodplain lands in this reach had small farms. Below St. Paul, where the floodplain widened, farms again approached the bluff edge in places and farmers tilled patches of the floodplain itself, including the larger islands, like Grey Cloud. We do not know exactly what farmers grew on their lands in the MNRRA corridor, but the context provided above offers some clues.[32]

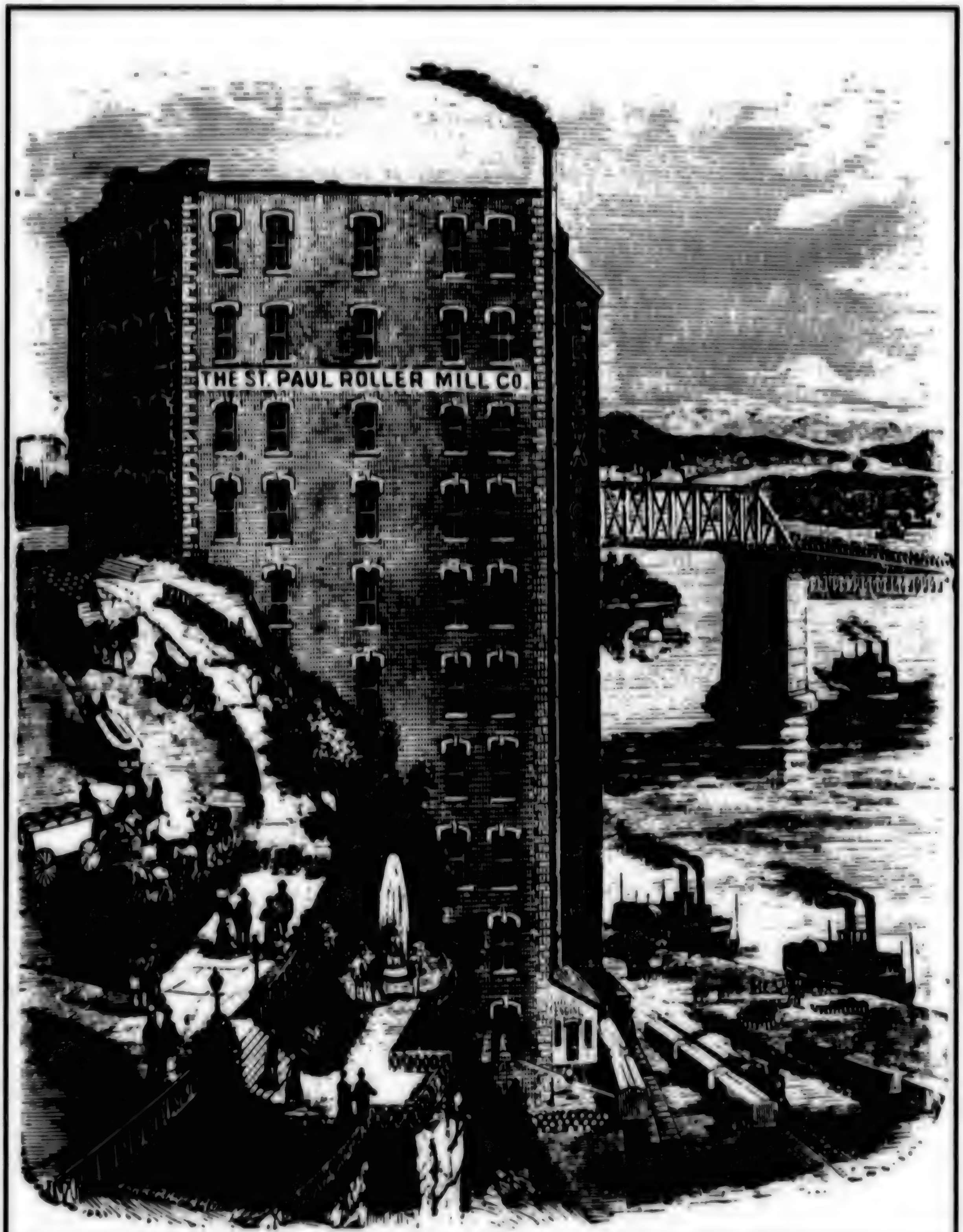
Flour Milling • St. Anthony Falls dominated flour milling in the MNRRA corridor, but, like timber milling, flour milling was important to communities above and below the falls as well. Flour mills were among the earliest businesses in many MNRRA communities. When owners of a mill in Anoka completed it on February 1, 1855, local pioneers had not yet grown enough wheat to supply it. So the owners imported 6,000 bushels from Iowa and Wisconsin. Although fire soon destroyed the mill, the owners quickly rebuilt it.[33]

Flour milling grew rapidly in communities above and below St. Anthony Falls and became important to their economic development. Hastings acquired flour mills in the 1850s and Samuel S. Eaton completed a flour mill in Nininger in 1858. Eaton began constructing the mill in 1857 by cutting away 50 feet of a bluff to make room for his machinery. Crystal Lake (northwestern Minneapolis) had a flour mill by 1859 on Shingle Creek. In 1860 Frank Weitzel built a flour mill in Dayton and fourteen years later erected a new mill. A later owner put on a 20- by 50-foot addition, and, by 1905, it had become "a first-class Merchant and Custom mill, with a reputation second to none."[34] Twenty-six men worked at the mill. A flour mill opened in Champlin by 1867. And John Banfil, a native of Vermont, first came to St. Paul and in 1849 moved to Rice Creek in Fridley (Manomin), where he built a hotel and mill. By 1881 St. Paul had seven flour mills, including at least one in Phalen Creek and another near the Wabasha Street Bridge (*Figure 6*).[35]

The millers at St. Anthony Falls recognized the value of mill sites upriver. In 1880 the Washburn Mill Company built the Lincoln Flouring Mill on the Rum River in Anoka, with a capacity of 600 barrels per day. Although it burned in a great conflagration on August 16, 1884, the company immediately rebuilt it. By the turn of the century, its output had grown to 1,600 barrels per day.[36]

The history of flour milling in the MNRRA corridor is essential to understanding how its communities developed. Along with the fur trade and lumber milling, flour milling

FIGURE 6. St. Paul Roller Mill Company near Wabasha Street Bridge. 1881. Minnesota Historical Society.


THE ST. PAUL ROLLER MILL CO.

underlay the economic growth of most of the corridor's towns and cities. These businesses provided the first employment and first capital that allowed other businesses to grow. While many of the early mills are gone, the sites and their history can be interpreted.

Grain Marketing • As Minnesota's grain production increased, as its flour milling grew, and as railroads established the means to market huge quantities of grain nationally and internationally, entrepreneurs saw the opportunity to control grain buying, selling and shipping. Two men dominated the industry by the start of the twentieth century: William Wallace Cargill and Frank Hutchinson Peavey. They both located in Minneapolis in 1884 and "ensured that it would become the world's leading grain exchange center." Cargill established a warehouse and offices in Minneapolis, and Peavey moved his headquarters to Minneapolis after the Minneapolis Millers Association became his largest buyer. Both became members of the Minneapolis Chamber of Commerce. Joined by the flour millers and other grain merchants, Peavey and Cargill helped the Minneapolis Chamber control grain trading in the Midwest. By 1890 Cargill owned 71 grain elevators, and by the beginning of the twentieth century, Peavey owned 18 terminal facilities with 26 million bushels of storage capacity in Minneapolis. "Peavey," says historian Jerome Tewton, "revolutionized the role of the grain middleman."

As grain merchants in Minneapolis strengthened their grip on the marketing of the region's grain, farmers began to protest. The Equity Cooperative Exchange became one of several farm organizations created during the early years of the twentieth century to challenge the grain traders. Started in Minneapolis in 1908 and incorporated under the laws of North Dakota in 1911, the Equity first directed its attention to the marketing of spring wheat, and challenged the Minneapolis Chamber of Commerce. The Equity and other critics accused the Chamber of monopolistic practices, including the rigging of prices and commissions against farmers. The Federal Trade Commission estimated that 70 percent of the grain grown in the region between 1912 and 1917 funneled through the city. The Equity believed it needed to organize an alternative terminal marketing firm and possibly build a terminal elevator to guarantee fair prices. As the Equity gained strength, the Chamber fought back. In October 1912, the Chamber refused to allow its members to trade with groups or individuals it believed unfairly criticized the organization.

In 1914 the Equity moved its offices from Minneapolis to St. Paul, where the city had promised free land along the upper levee for building a terminal grain elevator, and established its own grain exchange. The Equity quickly began building its new elevator on the upper levee, between Chestnut and Sherman Streets. The location provided access to rail lines and to the river. The Equity broke ground in 1915 and completed the new building in 1917. At the dedication ceremony, Equity's President, J. M. Anderson, baptized the building with river water, hoping that the river would again become a factor in grain shipping.

The Chamber rejected the idea that St. Paul could estab

lish a grain exchange and terminal facilities. In 1917 the Chamber asserted that it was "utterly ridiculous" that "this milling industry, linseed oil industry and terminal elevator industry, can be transported to St. Paul by the establishment of a small pretended grain exchange or selling agency. . . ." To farmers, however, their own elevator in St. Paul represented independence.

As the navigation history told in Chapter 5 shows, commerce did not come back to the river, and navigation boosters began the movement that led to the 9 foot channel project. In 1927, as part of its effort to encourage the return of river traffic, St. Paul approved an expansion of the old Equity elevator. The new addition included a 22,000 bushel, concrete elevator, a sack house and a loading dock (*Figure 7*). Today, these buildings are the only remains of the original Equity complex, but they are rare and valuable assets for telling the history of grain trading, farm protest and river shipping in the MNRRA corridor, in Minnesota and in the nation.

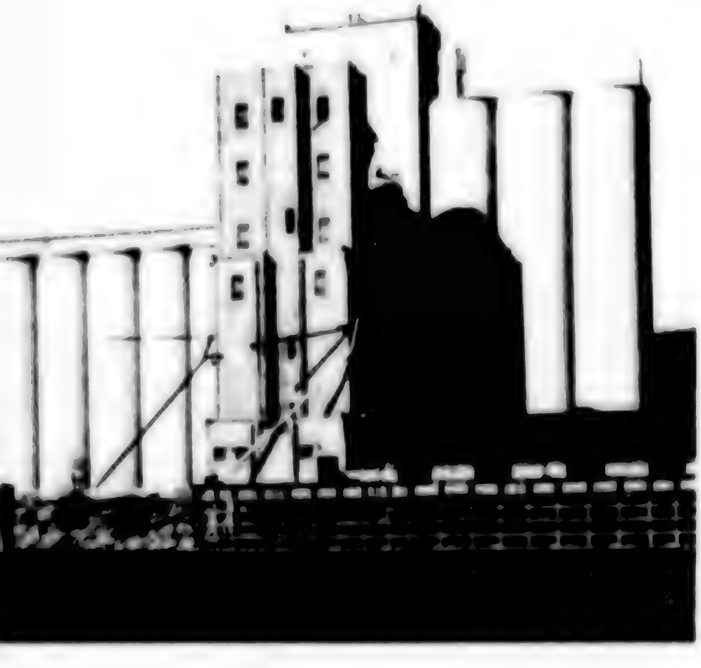
In 1938, 121 cooperatives from Minnesota, the Dakotas, and Montana, including the Farmers' Union, formed the Grain Terminal Association (GTA), allowing the Farmers' Union to expand its market. The Federal government's completion of the 9 foot channel in the Mississippi in 1940 aided this expansion. By the end of the 1940s, roadway movement of grain was increasing as well, prompting terminal elevators to upgrade their truck handling facilities. As one historian noted, "This meant huge expenditures by the GTA for improving their facility at St. Paul on the river."

Many improvements occurred at the St. Paul elevator complex during the 1950s. In 1951, the Farmers' Union Grain Terminal Association added a truck scale and dump, and in 1955 they expanded the truck dump and added a car dump, a headhouse on top of the original bins, and an office building.

By the 1950s, farm cooperatives were common. "The radicalism of 1916," said historian Robert Morlan, "is in large measure the accepted practice of today." Although it could not replace Minneapolis as a grain trading center, it did become the first cooperatively owned terminal elevator in the country. St. Paul's 1931 addition to the elevator, the Municipal Grain Terminal, fulfilled two historically significant roles. First, it was part of the regional campaign, supported by businessmen, politicians, and farmers, to improve facilities on the Upper Mississippi as an impetus to barge traffic. Second, it represented St. Paul's determination to compete with Minneapolis as a regional grain terminal center.

Stockyards • Just as some entrepreneurs saw an opportunity to consolidate the marketing of grain in the Twin Cities, others thought the same could be done for livestock. A. B. Stickney, President of the Minnesota and Northwestern Railroad (later the Chicago Great Western), recognized the potential for stockyards in the Twin Cities area. Minnesota

FIGURE 7. Farmers' Union Grain Terminal Association complex, 1955. The St. Paul Municipal Grain Elevator and Sack House lie in the forefront of the complex at the right. Minnesota Historical Society.



had the pasturage and grain to feed cattle. Proponents of stockyards estimated that railroads carried some 75,000 western cattle through St. Paul to Chicago each fall, and Twin Cities residents ate the beef from about this many cattle each year. The Twin Cities had several small stockyards, but these mostly fed cattle on their way to Chicago. Rather than watch western cattle go to Chicago, Stickney wanted to establish a large stockyard and slaughterhouse in St. Paul.[17]

In April 1886 Stickney acted quickly to realize his vision. He engaged a number of potential investors, including James J. Hill. Needing cattle, he went to a cattlemen's convention in Montana to sell his idea. He argued that it would be 400 miles shorter to St. Paul than to Chicago. The shorter trip would cost less and reduce injuries to and "shrinkage" of the livestock. Stickney believed that the Twin Cities and the region to the west and north could consume much of Montana's cattle. On May 3, 1886, Stickney hosted a meeting of business interests in St. Paul and invited a representative from the western cattle ranchers. Hill then invited the investors and a representative of the western cattle ranchers to his farm in North Oaks. Now committed to the enterprise, Stickney acquired options on land in South St. Paul. He chose the site for its location near his railroad and because of its proximity to the Mississippi, which could take the stockyards' waste downriver, away from St. Paul. Convinced he had secured what he needed, Stickney began marketing cattle by the end of the year.[18]

The stockyards drew meat packing plants and related industries to South St. Paul. According to Jerome Tewton, in his article "The Business of Agriculture," "The stockyard company provided the facilities and services (food, water, pens, veterinarians, animal managers) for selling and buying livestock. Commission merchants handled sales for a set fee; their task was to strike the best possible price for the producer."[19] The stockyards received 5,831 rail cars of livestock the first year, and in January 1888 the first packing plant opened. For their first ten years the yards struggled. By 1900, however, meat packing ranked as Minnesota's fourth leading industry by value of product.[20]

The stockyards and the Twin Cities railroad network that centered on it helped South St. Paul become a regional livestock center. Swift, Armour, Cudahy, and Wilson, four of the nation's five leading meat packers, established plants in South St. Paul. "Meat-packing," according to historian Kirk Jeffrey, "enjoyed more rapid growth than did any other major Minnesota industry in the first two decades of the century."[21] Swift and Company started in 1897. Armour & Company opened a $14 million plant in South St. Paul in 1919, creating thousands of jobs. Both companies may have chosen the Mississippi site due to the availability of cheap, clean ice. Cudahy, a major Chicago meat packer, came in 1925 and remained a large employer until its plant closed in 1952. Thirty-six firms worked at the stockyards during its heyday following World War II. By the 1960s, the stockyards and associated operations began declining, as the business decentralized. By the 1980s only seven commission firms remained.[22] *(Figure 8)*

Brewing • Brewing is another river industry in the MNRRA corridor that can be traced to Minnesota's territorial days. It is also an industry that gave rise to nationally recognized products. Unlike the other industries, breweries employed the river valley's geology in a unique way. To make beer, brewers needed knowledge of the process, good water, barley, malt and hops, and they needed a place to store their product. Minnesota's lands could produce the barley, malt and hops, and fresh water was abundant. From St. Anthony Falls downstream, the Mississippi River valley's geology provided for storage. The soft St. Peter Sandstone bluffs along this reach allowed brewers to excavate tunnels deep under the bluffs to cool and age their beer. Minnesota and the Twin Cities also provided a heavy concentration of German immigrants who enjoyed beer and who had the know-how needed for brewing. In 1887 Minnesota had 112 breweries and ranked fifth nationally in beer production but only twentieth in population. A dozen breweries were in St. Paul, "the number one brewing center in the state," but Minneapolis and Hastings also had breweries.[23]

Nationally, Americans had been making beer since the colonial era, but production took off in the mid-1800s, and the number of breweries increased around the country. After pasteurization was perfected in 1875, bottled beer became popular and beer bottling a common industry. By 1900 refrigerated railcars allowed brewers to distribute their beer widely.[11]

In Minnesota, brewing began in St. Paul, and St. Paul would dominate the state's beer production. Most St. Paul brewers were German immigrants who started their businesses soon after arriving. One of these immigrants, Anthony Yoerg, opened the first brewery in St. Paul in 1848 (a year before Minnesota became a territory). Although he initially located on the east side of downtown, in 1871, Yoerg moved his brewery to the west side bluffs at Ohio Street, two blocks south of what is Water Street today. Here he built a large stone brewery and excavated nearly a mile of caves for cooling his beer.

Determined to become a major brewer, he designed a

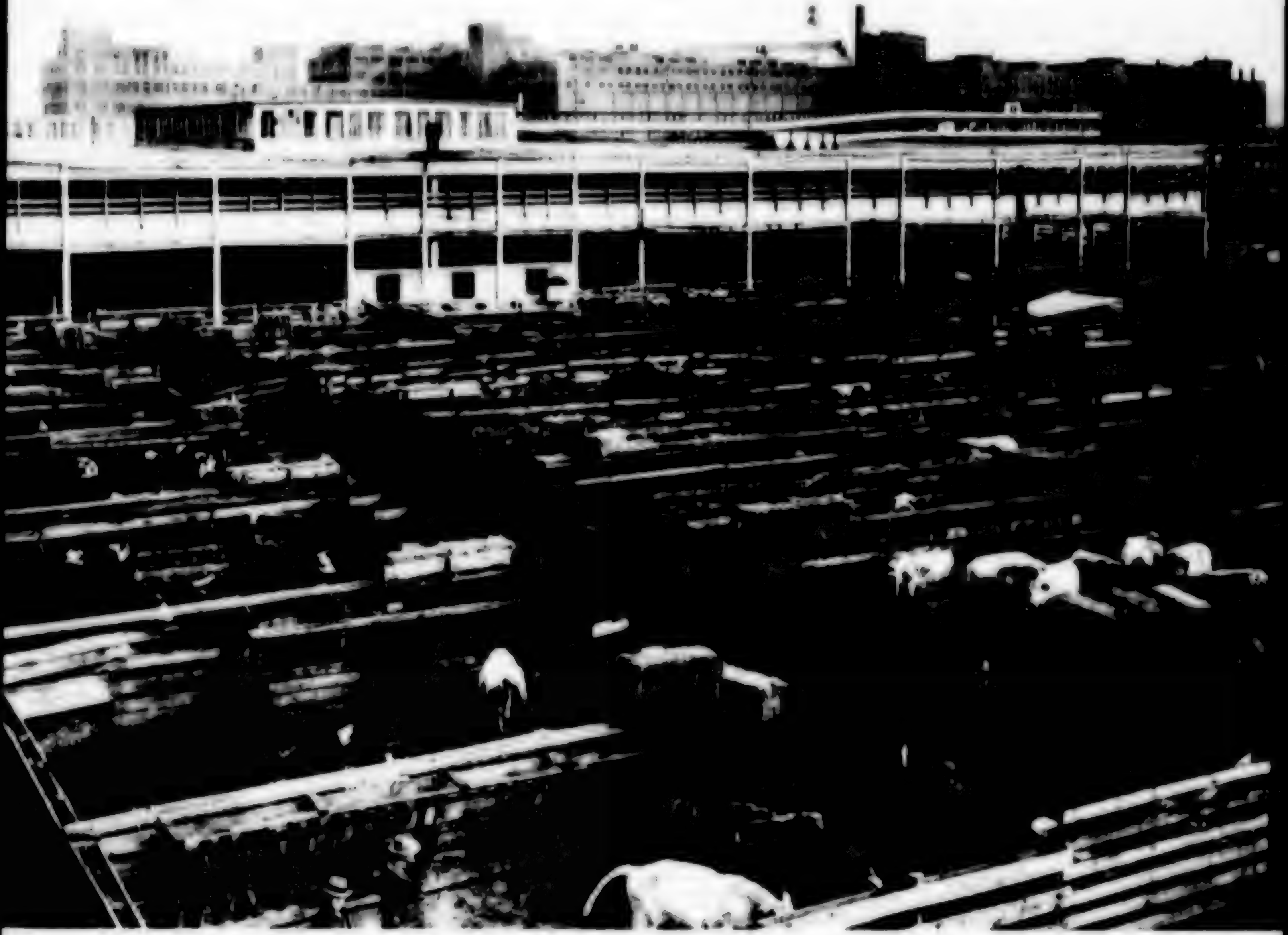


FIGURE 8. Cattle pen, South St. Paul Stockyards, 1930. Photo by Peter Schawang, Minnesota Historical Society. By this time, four of the nation's five leading meat-packing companies had lcoated at the stockyards.

steam powered plant capable of producing 50 barrels per day. He was selling 20,000 barrels per year by 1881 and 35,000 by 1891, making him one of the state's largest brewers. Using the label "Yoerg's Cave Aged Beer," Yoerg's successors kept the business going through all the depressions and through Prohibition (1919 to 1933). Not until 1952 did the brewery close. The only remains as of 1981 were the brewery's cave and foundation at the bottom of Ohio Street.

In 1853 Martin Bruggemann established what was probably the second brewery in St. Paul, in a house near the intersection of Smith and Kellogg Boulevard. After the brewery burned, he moved to Sixth and Pleasant, where he built a stone building. Then, in 1872, he moved to the west side bluffs near Wabasha Street, just 150 yards from Yoerg. For more than 25 years he made beer at this site and stored it in caves excavated into the bluff. In 1900 he sold the brewery, and in 1905 it closed. As with Yoerg's brewery, the principal remnants of Bruggemann's plant are the caves.

Another brewery, called the North Mississippi Company, opened in 1853. Built on top of the bluffs near present day Shepard Road and Drake Street in the West Seventh Street neighborhood, it was destroyed by fire. Frederick and William Banholzer reconstructed it, and made it into one of the more successful breweries in St. Paul in the 1880s. The Banholzers dug caves that extended a half mile deep and had many chambers. But within a year after William died, in 1897, the business closed.

Three more breweries opened in St. Paul in 1855, two of which would give birth to the state's largest breweries and to nationally recognized beers. Until purchased by Frederick Emmert in 1866, the City Brewery near Eagle and Exchange Streets in Uppertown, remained a small operation. By the 1880s, however, Emmert built it into a well known brewery capable of producing 6,000 barrels per year. He used a nearby sandstone hill for storage. Emmert died in 1889 and left the business to his sons. They had different interests, however, and sold the brewery to Theodore Hamm in 1901. Happy to be rid of a competitor, Hamm used the old brewery for storage.

Hamm began his career at Phalen Creek. The creek with its sandstone cliffs and once fresh water became home to at least four breweries. One of the four, the Pittsburgh Brewery, started in 1860 by Andrew F. Keller, was on the east bank, at the intersection of Greenbrier and Minnehaha. Four years later Keller sold it to Hamm, who would make it into the largest brewery west of Chicago. By 1878 Hamm had boosted production from 500 barrels per year to 5,000. By 1882 the plant's output had jumped to 26,000 barrels. In 1903, after his father's death, William Hamm ran the brewery until his own death in 1931. Under William Hamm, the brewery became a national leader.

Christopher Stahlman, who opened his Cave Brewery on July 5, 1855, excavated one of the most elaborate storage systems on the river. Locating his brewery on Fort Road, at the far west end of the city at that time, he excavated three levels of caves a mile deep into the sandstone bluffs. Having come to St. Paul with only a few dollars, he created what would become, from at least 1876 to 1879, the largest brewery in the state. By the mid 1880s he was producing 40,000 barrels per year but had fallen behind Hamm and others. Stahlman died of tuberculosis in 1883, and by 1894 all three sons, who had taken over the business, succumbed to it as well. As a result, the brewery went bankrupt in 1897. Another firm owned it for three years, and then the Jacob Schmidt Company (formerly the North Star Brewery) bought it in 1900.

Schmidt did not found the North Star Brewery but would make it into a nationally recognized company. The North Star Brewery was the third company to begin in 1855. Two men, named Drewery and Scotten, opened it in two small buildings and used a cave at Dayton's Bluff. In 1879 Reinhold Koch took control and built the company into the second largest brewery west of Chicago by the 1880s, but in 1884 Schmidt bought out Koch. Fifteen years later Schmidt changed the name to the Jacob Schmidt Brewing Company. When the plant burned in 1900, Schmidt moved to the Stahlman facility, which he completely renovated and expanded. The new brewery could produce

200,000 barrels per year. Jacob Schmidt died in 1911 and left the business to his daughter, Maria, and his son in law, Adolph Bremer. Bremer's brother, Otto, an executive with the National German American Bank of St. Paul, joined the company shortly after. When Adolf died in 1939, Otto ran the company until 1951 and then sold it to the Pfeiffer Brewing Company. Other breweries existed in St. Paul at various times, but those discussed above were among the most important.

Minneapolis had a dozen breweries near the riverfront by the late nineteenth century. Built in 1850, John Orth's brewery was the first and was located where the old Grain Belt Brewery now stands. By 1880 Minneapolis counted four breweries. Two operated on the west side river flats, or Bohemian Flats, near the University of Minnesota's West Bank. "These two breweries," says archaeologist Scott Anfinson, "dominated the landscape of the river flats into the early twentieth century." Both employed people living in Bohemian Flats. Orth's Brewery and the Germania Brewery were the other two breweries in Minneapolis. In 1891 the four companies merged to form the Minneapolis Brewing and Malting Company, which the next year built the Grain Belt Brewery. (Figure 9)

Prohibition and consolidation led to a dramatic decline in the number of breweries in Minnesota. In 1900 the state had 50 fewer breweries than it did 20 years earlier, and by the start of Prohibition in 1919, only 51 breweries remained (down from the 112 in 1887). The Steffan Kuenzel Brewery in Hastings became a casualty of Prohibition. Founded in 1885 on Ramsey Street on the levee, it operated up to 1919. The brewers who survived Prohibition did so by bottling pop and other drinks.

Brewing sites are important for the local and national stories they represent. The history of brewing involves the stories of early immigrants, particularly Germans, and how their ethnic origins influenced the development of beer making. This history leads into the political and social aspects of Prohibition nationally and locally. Many German immigrants chose the Democratic Party for its stance against Prohibition. Caves that once stored beer became hideouts for illicit clubs, defying Prohibition.

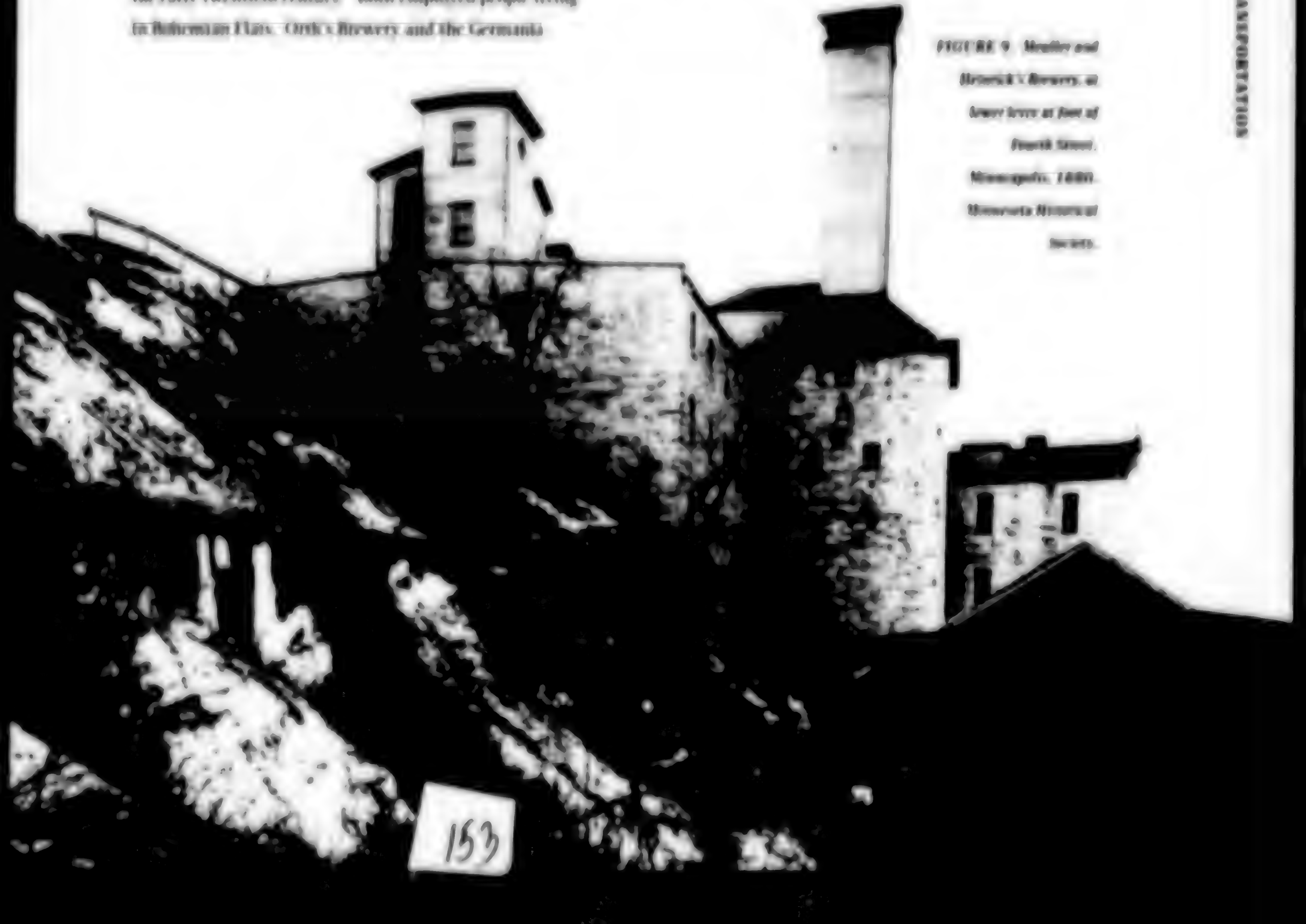


FIGURE 9. Mueller and Heinrich's Brewery, at lower levee at foot of Fourth Street, Minneapolis, 1880. Minnesota Historical Society.

Although little has been written about it, natural and human made caves also have been used to store cheese and grow mushrooms. The cool, dark cave climate was ideal for both of these products, as well as beer.

Transportation and Economic Development

Transportation modes often determined the nature and extent of business development in the MNRRA corridor and the relationship of the river's communities to the Mississippi River. Fur traders used canoes, pirogues and keelboats and depended upon the Mississippi and its tributaries to receive their trade goods and take furs out. The craft traveled almost as easily above the St. Anthony Falls as below it. Fur traders located their posts near the river, to limit how far they had to carry their goods and furs. As cities in the area grew and as the area's transportation system evolved, new transportation systems replaced the river and fewer and fewer people considered the Mississippi central to their lives.

Steamboats maintained the corridor's tie to the river. Although few in number, steamboats plied the river above the falls. By the summer of 1849, an American Fur Company steamboat worked above falls. It made several trips delivering flour to the company's post upriver but also carried passengers and supplies. In May of 1850, another steamboat, the *Governor Ramsey*, completed a voyage to Sauk Rapids. Possibly on this voyage, the steamer carried settlers to Itasca Village (later Ramsey) which would establish a steamboat landing. In 1855 low water stranded the steamboat *H. M. Rice* at Anoka, and the town temporarily used it for church services.

Railroads replaced steamboats more quickly above the falls than below. By 1881 steamboat navigation above the falls had become irregular, at best. This was undoubtedly because the river above the falls was often shallow and received little navigation improvement work. And other than Minneapolis, steamers operating above the falls did not have access to large ports from which to acquire and deliver passengers and freight, which were essential if steamboats hoped to compete with railroads. While some steamboats may have paddled on the river above St. Anthony after 1881, not many did so and they did not last long.

Ferries • Even after railroads expanded through the MNRRA corridor, ferries provided the primary way across the Mississippi River until bridges were built. Entrepreneurs began operating ferries at the earliest settlements. Lt. E. K. Smith's map of the Ft. Snelling area in 1837 and 1838 shows Brown's Ferry running from Camp Coldwater to Brown's grog shop across the river. In the fall of 1848 or spring of 1849, Antoine Robert, who owned the fur trade post at the mouth of the Rum River, established a rowboat ferry at Anoka. Antoine's brother, Louis Robert, later acquired the Rum River post and began running a swing

FIGURE 10. Point Douglas Ferry, about four miles south of Hastings, 1902. Minnesota Historical Society. This was one of the earliest and longest running ferries in the MNRRA corridor.

ferry big enough to carry a team of horses or oxen across the Rum. One of his largest customers was Borup & Oakes, who sent their Red River Oxcart supply trains across the river. On September 11, 1855, the Elm Creek and Anoka Ferry Company made its first trip.

Several well known Minnesota pioneers received grants to run ferries in St. Paul in 1850. James M. and Isaac N. Goodhue acquired charters to run a ferry at the lower landing, and John R. Irvine won a charter to operate one from the upper landing. Daniel F. Brawley also received a charter to operate a ferry from the upper levee to West St. Paul in 1852. The ferries plied the river until 1859, when the Wabasha Street Bridge opened. John Goodspeed started a ferry at Fridley by 1854, and the Truax and Anderson ferry ran from 1883 to 1887 at St. Paul Park. In the latter year, the Rock Island Railway Company built a combined railroad and pedestrian bridge over the Mississippi at St. Paul Park, ending the ferry's service.

Ferries at both ends of the MNRRA corridor lasted up to the end of nineteenth century. One of the earliest and longest lasting ferries operated at Hastings. Started in 1854 by William Felton, it brought Wisconsin farmers and their produce to the growing storage and shipping facilities at Hastings. The ferry remained active until the Spiral Bridge was built in 1895. One of the last ferries in the MNRRA corridor may have been at Dayton. It is the only ferry indicated on the Mississippi River Commission map that includes Dayton, which dates to 1898. Ferries helped prolong direct contact with the river, but the increasing number of roads and railroads would begin drawing people away. *(Figure 10)*

Roads • The U.S. government built the first wagon road through the MNRRA corridor, after Congress approved $40,000 for military roads in the Minnesota Territory in about 1850. One road, which ran from Point Douglas, at the St. Croix River's mouth, along the east bank to Fort Ripley, received $10,000. The road traveled the entire length of the MNRRA corridor. James Simpson conducted the survey for The Military Road, as most people called it, in 1851, and the federal government started construction the next year. In 1852 the builders pushed the road to Itasca Village (Ramsey). The Red River Oxcarts quickly employed it in their journey between the Twin Cities and the Red River Valley. In 1855 some 300 oxcarts passed over the road on their way to St. Paul. Other military roads constructed in the 1850s included the Mendota-Wabasha Road (St. Paul to La Crosse Road) and the Ellis and Hastings Road.

The Topographical Engineers, a branch that temporarily split from the Corps of Engineers in 1831, surveyed and built the military roads. To cross streams and rivers, they erected some of the first bridges in the MNRRA corridor. In 1852 they built bridges over Coon and Rice Creeks and one over the Rum River at the current location of the Main Street Bridge in Anoka. As soon as the government made the crossing site known, plans for the town began." At Cottage Grove, the military road also influenced the development of the town. "Old Cottage Grove Village," states Vogel, "grew up where the Military Road crossed the trail leading from Grey Cloud Island to Stillwater." The government erected the first bridge across the Vermillion River, a covered bridge, in 1856. The bridge remained in use until 1888 and was replaced in 1898.

Roads and bridges began the process of taking people away from the Mississippi River. While the early roads paralleled the river, they were often far enough back that the sights and sounds of the river faded. Hotels and stores began locating along the roads, not the river. Bridges carried people over the river; no longer did they have to get down by it so they could touch and smell it.

Railroads • Railroads transformed the MNRRA corridor and its inhabitants' relationship to the Mississippi most dramatically. Railroad development in Minnesota provides a good example of the speed and coverage with which railroads expanded in the Midwest. On June 28, 1862, crowded with local dignitaries, Minnesota's the first train steamed along the first railroad from St. Paul to St. Anthony. Only a year and one half later, on December 6, the St. Paul and Pacific reached Fridley and six days later Anoka. By the end of the Civil War, railroads had laid tracks from Minneapolis 50 miles southward toward Faribault. By the beginning of the next decade, lines extended outward from Minneapolis some 65 miles northwest to St. Cloud and more than 125 miles to west Benson. A line begun in 1868 and completed in 1870 connected the Twin Cities and Duluth, providing another outlet to the Atlantic Ocean. Railroads made two important connections with Chicago. In 1868 the Milwaukee and St. Paul completed a line from Chicago through Prairie du Chien and southern Minnesota to the Twin Cities, and in 1870 the Minnesota Central Railway Company opened a line also running through southern Minnesota connecting the Twin Cities with Chicago via a line through Iowa.

By 1900 railroads linked the Twin Cities to much of Minnesota and most of the nation. Two transcontinental lines crossed Minnesota before 1900. On September 8, 1888, the Northern Pacific finished the first transcontinental railroad, running through Minnesota from Moorhead to the Twin Cities. In June 1893 the St. Paul, Minneapolis and Manitoba opened the second transcontinental railroad. The new railroad connected Minneapolis and St. Paul to Seattle, Great Falls, Grand Forks, and other cities.

The 1895 and 1898 Mississippi River Commission maps clearly reveal the extent to which railroads had taken over lands near the river in St. Paul and Minneapolis. From Minneapolis north to Ramsey, the Northern Pacific and the Great Northern Railroads ran parallel to each other along the east side. The railroad tracks lay, for the most part, outside the MNRRA corridor. On the west side, from the mouth of Shingle Creek in north Minneapolis up to Dayton, no railroads ran near the river. Beginning in north Minneapolis, however, railroads began to converge on the milling district. They included the St. Paul and Duluth; Minneapolis, St. Paul and Sault Ste. Marie; Great Northern; Northern Pacific; and Chicago, Milwaukee, and St. Paul (short line). Large railroad yards lay on the west side just above Nicollet Island and across from the Lower Lock and Dam. The railroad lines dispersed below St. Anthony but converged again in St. Paul. The railroads crowding into St. Paul included the Chicago, Burlington & Northern; Chicago, Milwaukee & St. Paul; Chicago Great Western; and Chicago, St. Paul, Minneapolis & Omaha. Near the mouth of Phalen Creek, a huge railroad yard occupied the creek's former valley.

Downriver from St. Paul, the railroads fanned out. The Chicago Great Western Railroad crossed under the Robert Street Bridge, over the Mississippi and ran below the west side bluffs past South St. Paul, until coursing away from the river to the west above Pine Bend. The Chicago, Milwaukee, and St. Paul and the Chicago, Burlington & Northern railroads left the railyard in downtown St. Paul, side by side, until diverging at Newport. The Chicago, Burlington & Northern continued along the east side bluff. The two railroads converged again several miles above Hastings. But opposite Hastings, the Chicago, Milwaukee, and St. Paul crossed into the city and headed downriver on the west side. The Chicago, Burlington & Northern continued down the west as well. From the Minnesota River into St. Paul and then downriver to Hastings, railroads that ran in the floodplain and near the bluffs were in what is now the MNRRA corridor. Overall, railroads altered the corridor's physical character little outside the milling district and downtown St. Paul.

Railroads quickly undermined the river's importance for transportation. Towns began growing up around their rail connections rather than their tie to the river. Symbolic of this change, Fridley is named Fridley Park Station on the 1898 Mississippi River Commission map and was immediately adjacent to the Great Northern and Northern Pacific Railroad.

Paul Hesterman, in "The Mississippi and St. Paul," provides the most comprehensive description of railroad expansion and its impact on the economy of a city in the MNRRA corridor. He also examines the effect of railroads on the city's landscape and its relationship to the river. Overall, Hesterman offers a model that could be used for other cities in the corridor.

St. Paul, like most cities, encouraged and promoted railroad development, which hastened the river's demise as a central element in the city's success and identity. St. Paul sold bonds to subsidize early rail development. As railroads filled in the floodplain and located their tracks and stations there, warehouse and transfer businesses quickly followed. Facilities built by James J. Hill and steamboat magnate Commodore William Davidson relied on steamboat traffic, but as railroads captured the passengers and commodities once carried on steamboats, the warehouses, transfer buildings and other businesses located along the railroads had little to do with the river.

Between 1875 and 1920, St. Paul became a "Rail City." Railroads and the facilities and businesses built to accommodate them dominated riverfront development. "Rails," Hesterman asserts, "dictated industrial location, and industrial development within the river valley often had more to do with the railroads than the river." The same held for commercial development. "By 1920," Hesterman concludes, "the river probably was less important to St. Paul than at any time before or since. . . . the riverfront that once had been the vibrant heart of the city had become the back alley of rail depots and rail-oriented industries, crowded by trackage, inaccessible and undesirable. Pollution made the river itself offensive to the eye and nose." To varying degrees, the same can be said for many towns in the corridor.

Railroads took over the floodplain in St. Paul, because of the floodplain's low, even grade. Railroads began building into the wetland created by the mouths of Phalen Creek and Trout Brook as early as the 1860s, where nearly 200 years earlier the Dakota had landed with Hennepin and his French companions. Railroads steadily filled in the wetland and pushed the Mississippi riverbank outward. They cut back Daytons Bluff to make more room for tracks, destroying much of Carver's Cave. The lower landing became a railroad terminal, and the Union Depot was built and rebuilt in 1880, 1884 and 1915. The Minnesota Valley Railroad laid tracks in the floodplain at the upper landing and businesses began building around it. Between the upper and lower landing, the bluff bulged out toward the river, separating the two. So the railroads cut the bluff back and filled in toward the river. Other railroads built up and down the valley, filling more of the floodplain and further shaving back the bluffs. *(Figure 11)*

Overall, some of the most dramatic landscape changes in the MNRRA corridor have occurred at St. Paul. By the early 1900s, railroads had already altered the old riverbed, the bluffs, and the original streams that flowed into the Mississippi. During the 1920s and 1930s, the city began developing Holman Field on Lamprey Lake, which had been one of the river's largest backwaters in the metropolitan area. Although the field still floods during high water, the ecosystem qualities have largely disappeared. A high levee system has barred the river from the rest of its floodplain across from downtown St. Paul. The city built Shepard and Warner Roads out into the riverbed, continuing the process begun by early railroads and settlers. And St. Paul constantly supported business development in the floodplain. Public subsidies, as much as economic demand, Hesterman asserts, are responsible for the development of the St. Paul riverfront. Economic interests, he stresses, had used the city government as a tool to transform the riverfront since the city's beginnings, and not just downtown. The city, for example, persuaded the Ford Motor Company to locate above Lock and Dam No. 1 by yielding its claim to hydroelectric power to the company.

The completion of Lock and Dam No. 2 at Hastings, followed by the opening of the entire nine foot channel below St. Paul in 1940, also transformed the city's landscape. While railroads had kicked river related activities out of the St. Paul riverfront, the 9 foot channel brought

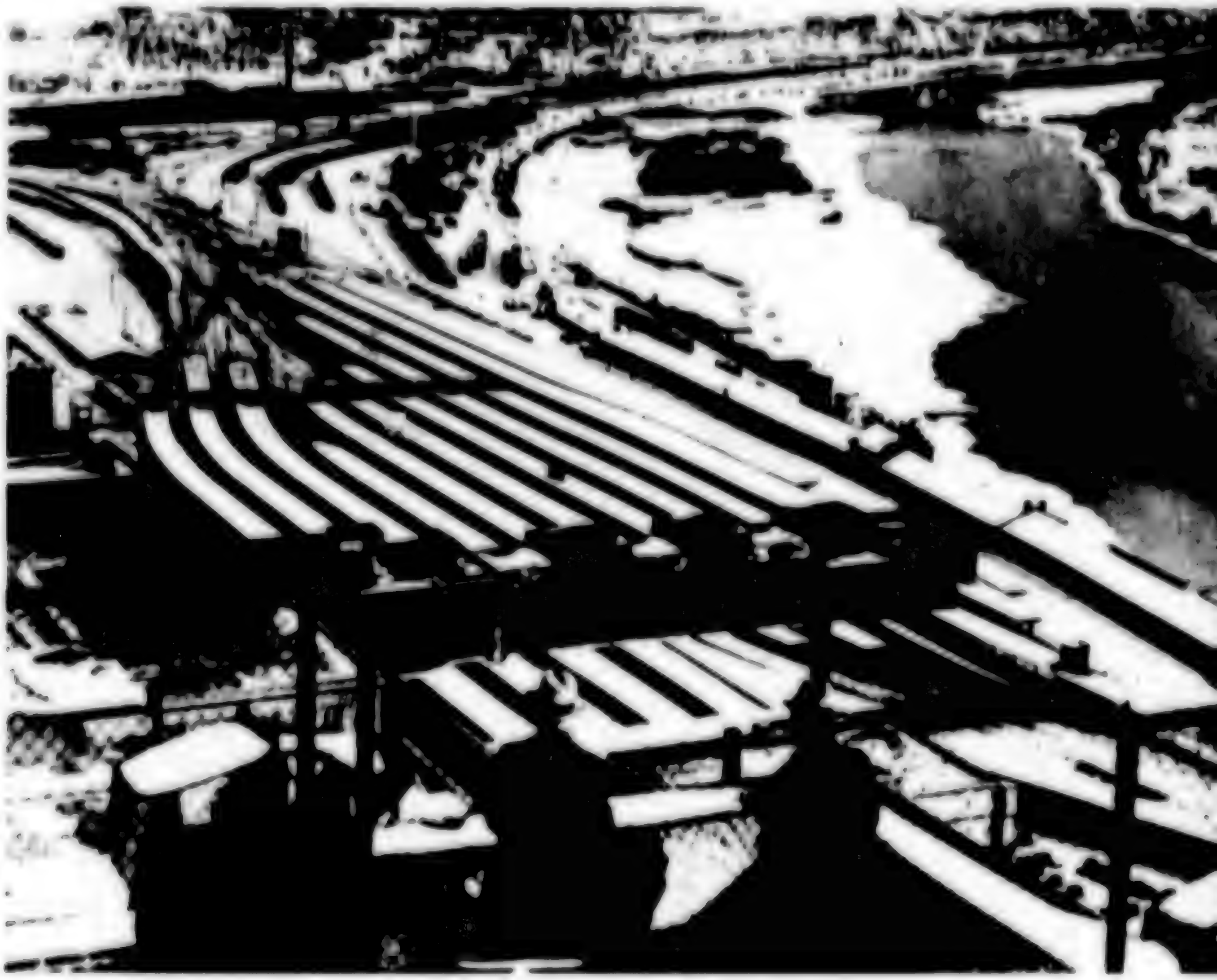


FIGURE 11. Railroads and low water undermined the Mississippi River as a commercial navigation route before locks and dams. Taken in 1931, this photograph captures the river immediately prior to the flooding of Pool 2. Photo by St. Paul Daily News, Minnesota Historical Society.

them back. Large terminals, like Terminal No. 1, Red Rock and Southport, have restored St. Paul's navigation heritage. Barge fleeting and repair operations along the downtown riverbanks clearly characterize St. Paul as a river town in ways that harken back to the steamboat days.

Streetcars to Cars and Trucks • Commuter trains, streetcars and trolleys began running through the MNRRA corridor in the early twentieth century, redefining the spatial relationship between work and home and between people and the river. They promoted urban and suburban expansion away from central cities and away from the river. Businesses and neighborhoods began locating along the lines.

By the early 1900s, the Twin Cities possessed "One of the nations' model streetcar systems . . . ." The Lower Hydro Station below St. Anthony Falls, completed in 1897, helped this happen, by providing electricity to the streetcars of the Twin City Rapid Transit Company. In 1913 a streetcar company completed tracks up to the Coon Rapids Dam, supplying workers and materials for the dam's construction. Although the cars initially ran on gas engines, by 1914 the company converted to electricity and pushed the line to Anoka. The streetcars ran regularly until about 1939. Also in 1914, the St. Paul Southern Electric Railway completed tracks to Hastings. The train ran from Hastings, through Pine Bend and Inver Grove, to St. Paul in about an hour. By the 1920s, however, cars and trucks began replacing streetcars, horses, buggies, and wagons. As World War II started, only the Twin Cities still operated their streetcars.

Cars and trucks accelerated urban and suburban expansion away from the river. The Great Depression delayed the impact of automobiles, but when a new economic boom began in 1946, most households acquired cars. Automobile registrations grew from some 2,500 in 1905 to about 747,000 in 1940 and 2.4 million in 1983. After 1950 the suburbs and businesses outside the city center began to mature. Between 1920 and 1970 the urban population grew from about 840,000 to nearly two million. By 1980 an 800 square mile outer city surrounded the pre-1920 metropolis, which had covered about 50 square miles. The metropolitan area's growing population and surging reliance on cars and trucks meant the road system had to expand dramatically. Freeway construction began in the 1950s. Once the focus of the area's residents, the river had become lost in a landscape it gave birth to. As the metropolitan population grew, houses, businesses and roads crept into more and more of the land within the MNRRA corridor. Less and less land remained or appeared natural.

Bridges • As communities in the MNRRA corridor expanded on the early military roads and as railroads pushed lines through the valley, a growing number of bridges spanned the Mississippi River. Bridges changed the flow of traffic and commerce for the communities they connected and influenced the transportation patterns, demography and economy of the area.

The Mississippi River Commission maps show the nature and extent of bridges across the Mississippi by the end of the nineteenth century. Bridges followed the settlement pattern. From the Minneapolis city limits down to St. Paul, 20 bridges stitched the riverbanks together, equally divided between railroad and wagon bridges. From north to south, the wagon bridges included those at Twentieth, Plymouth, Hennepin, Tenth, Washington, Franklin, Lake, Smith (High), Wabasha and Robert. The railroad bridges served a number of different lines.

Only three bridges crossed the Mississippi below the Robert Street Bridge down to Hastings. An 1887 railroad swing bridge crossed from near Inver Grove Heights to just below Newport. This bridge also served pedestrians. The remaining two bridges jumped the river at Hastings. One was a railroad bridge and the other the famous spiral bridge.

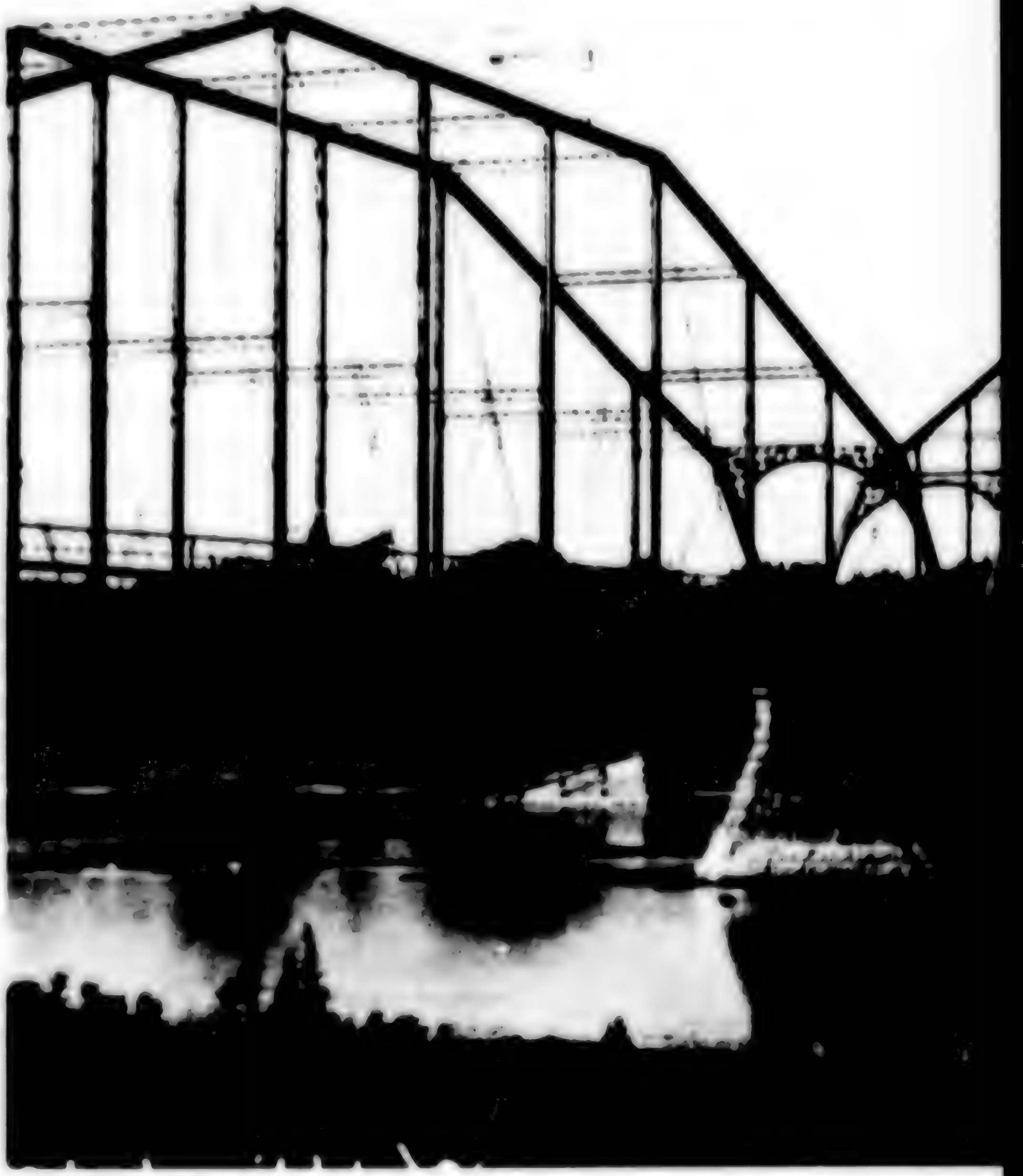
No bridges spanned the Mississippi River between the Twentieth Avenue Bridge in Minneapolis and the Ferry Street Bridge in Anoka (*Figure 12*). As the Ferry Street Bridge is at about river mile 871.5 and the Twentieth Avenue Bridge is near river mile 855.5, no bridge was available for a distance of some 16 miles. Above Anoka, only the ferry at Ramsey provided a way across the Mississippi. People in Minneapolis and St. Paul did not have to travel far to cross the river, although going on foot, by horse or in a wagon was not so quick as today. Above or below the Twin Cities, they had a long journey, unless they lived near one of the few bridges in these reaches.

Residents of Nininger devised one of the most creative bridges. According to the *Emigrant Aid Journal* of February 10, 1858, men from the town cut out a slab of ice nearly one half acre in size and floated it down to their crossing site, where they lodged it against opposing banks. The bridge allowed loggers to cut wood on an island near Nininger and stack it along the bank to sell to steamboats the next spring.

Many bridges merit individual discussion and are National Register listed or eligible. Many are gone, like the Hastings Spiral Bridge, the original High Bridge and the first bridge over the Mississippi River, the suspension bridge erected by Minneapolis and St. Anthony in 1854. The High Bridge opened in 1888 and was replaced in 1987. The Carnegie Keystone Bridge Company delivered the original High Bridge in one million pieces, with a 388 page manual. In 1859 the Wabasha Bridge became the first to cross the Mississippi from St. Paul to Dakota County. Fortunately, not all the historic bridges are gone. The original Robert Street Bridge was completed in 1885 and replaced in 1926 by the now historic, arched, Robert Street Bridge. That same year another concrete arch bridge—the Mendota Bridge—opened. It was, at 4,119 feet, the longest concrete arch bridge in the world.

Summary

One goal of this chapter was to provide the context in which businesses developed in the MNRRA corridor, rather



than to produce a list of all the different businesses. Another goal was to show how transportation affected the relationship of businesses and the area's residents to the river. Each new transportation method redefined that relationship. Navigation interests, railroads and road builders all transformed the river or its valley to accommodate their ends. Urban population growth, tied to these evolving transportation systems, meant that a smaller and smaller percentage of the metropolitan area's inhabitants thought about the river during their daily activities. Today, however, more and more people recognize the many amenities the Mississippi offers and are coming back to the river. They are interested in the river's history, its role in the development of the metropolitan area, and the businesses and transportation systems that underlay the area's evolution. They are looking for transportation routes that take them to the river, rather than away from it.

FIGURE 12. Mississippi River Bridge at Anoka, Minnesota, 1905. Minnesota Historical Society. Ferries remained important longer at the MNRRA corridor's southern and northern ends, where few bridges existed.

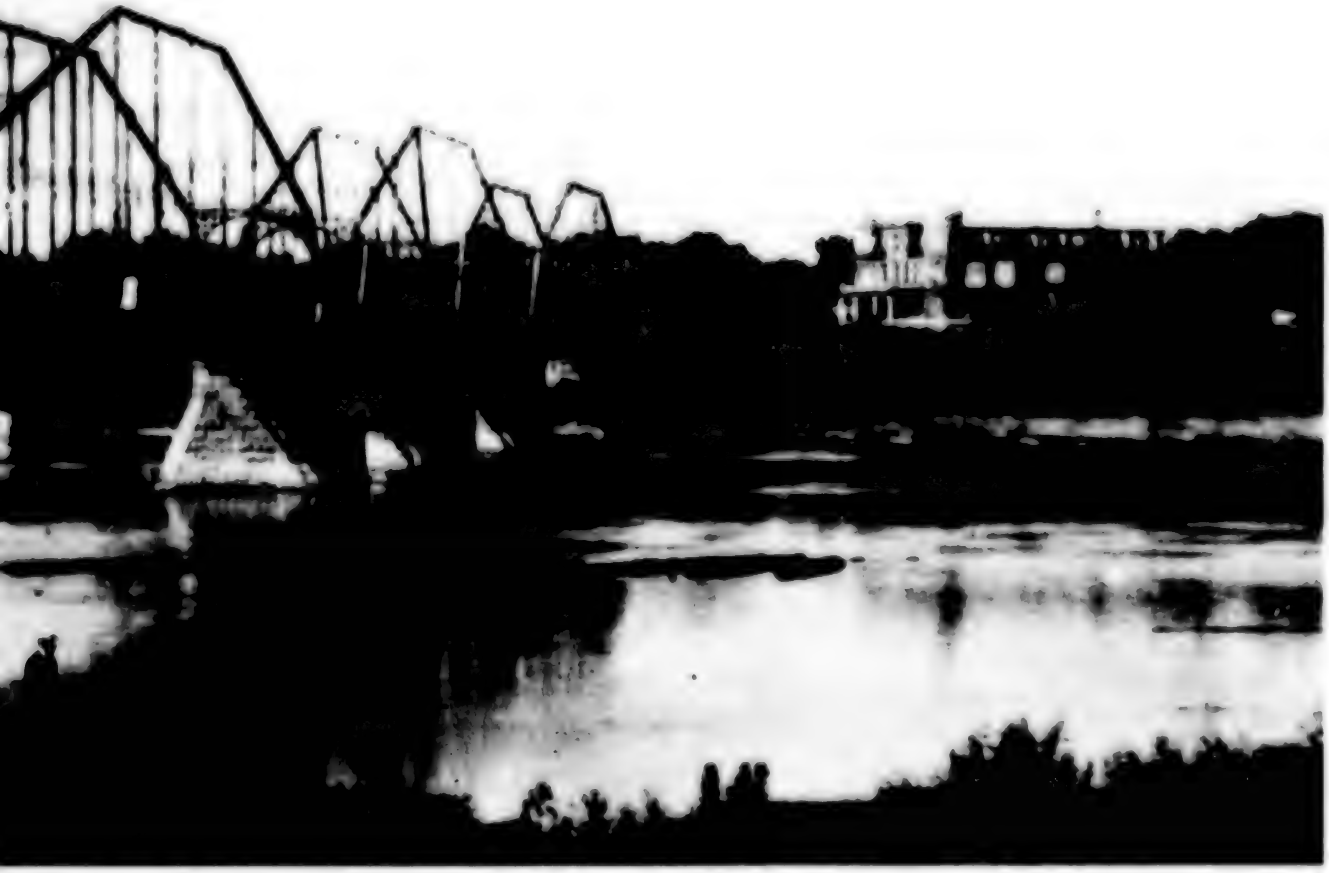


FIGURE 1. Urban river. Minneapolis skyline over the Mississippi River gorge.

Chapter 8

Settlement and Urban Residential Development Along the River, 1841-1950

Patrick Nunnally • University of Minnesota

This chapter focuses on the process of urban growth in the MNRRA corridor, examining what towns began where, when and why. It discusses residential settlement patterns but does not detail the commercial and industrial patterns that formed the economic basis for population expansion and contraction.[1] This is not a history of every community, every riverfront neighborhood, along the MNRRA corridor, and it is not an academic urban history. Urban history in the MNRRA corridor is intimately tied to the history presented in foregoing chapters. Geology and geography, the Native American presence, exploration and early military objectives, navigation improvements and economic activities all played a role in determining where towns located, how fast they grew, how they related to the river and how that relation changed over time. The information presented here draws on those stories. *(Figure 1.)*

Town formation in the MNRRA corridor began soon after settlers came to the upper Mississippi valley in the early 1800s. Between 1820 and 1945 dozens of settlements grew up in the MNRRA corridor. Today, these communities can be understood as having evolved in one of three patterns: towns and cities that formed in the nineteenth century and have endured as distinct urban areas (for example, Minneapolis, St. Paul, Hastings, Anoka, and South St. Paul); nineteenth century settlements that stagnated for a time and then grew up as suburbs in the expanding metropolitan area (such as Mendota, Fridley, Champlin, and Cottage Grove); and urban areas that formed in the suburban expansion following World War II (for example, Coon Rapids and St. Paul Park).

The present municipalities in the MNRRA corridor are listed in *Table 8.1*, according to the pattern in which they formed. The first column includes cities that established a central economic and population presence in the nineteenth century (all but one, South St. Paul, pre-date the railroad era) and have maintained a distinct downtown commercial district and sense of "municipal place" throughout the twentieth century. The second column includes population centers that reached a peak of regional importance in the nineteenth century, went through a period of stagnation but retain a distinctive "municipal place" in the greater metropolitan region today. Despite their spatial and political independence today, these communities exist largely as suburbs within the larger region. The third column is the most heterogeneous collection. Generally, it includes places that achieved a substantial population and regional presence only after World War II and the subsequent suburban transformation of much of the MNRRA corridor. Most were farming areas, organized as townships. However, this grouping also includes the township of Nininger, which had a brief but memorable life as a distinct community.[2]

Table 8.6

URBAN CENTERS

Enduring Urban Centers
Anoka
Hastings
Minneapolis
St. Paul
South St. Paul

19th Century Population Centers that are now suburbs within the metropolitan area
Dayton
Champlin
Cottage Grove
Fridley
Mendota
Newport
Richfield*

Population Centers that emerged in the 20th century (some may have briefly been population centers, then declined)
Brooklyn Center
Brooklyn Park
Coon Rapids
Crystal*
Denmark Township
Grey Cloud Township
Inver Grove Heights
Lilydale
Maplewood
Mendota Heights
Nininger Township
Ravenna Township
Ramsey
Rosemount
St. Paul Park

**Not in MNRRA now.*

The formation and development of towns in the MNRRA corridor fits roughly into three periods, defined by transportation modes—river, railroad and automobile—and the concomitant patterns of urban settlement. During the era of river transportation, towns developed at many places throughout the corridor. Between 1841, when St. Paul was established, and 1862, when the railroad connected St. Paul and Minneapolis, there were probably more named towns than at any other time. As railroads expanded, some towns blossomed into railroad hubs and others withered when the railroads bypassed them. During the last four decades of the nineteenth century, both St. Paul and Minneapolis witnessed spectacular population leaps, as they became regional railroad centers. By the end of World War II, railroads had peaked, and automobile use, which had begun as early as the 1920s, boomed in the post war years. This gave rise to expanded metropolitan areas that engulfed previous small towns such as Anoka, melding them to the suburban network around Minneapolis and St. Paul. A parallel development is the creation of post-war suburbs on land that had previously been agricultural.

Cities are made up of numerous communities, and St. Paul and Minneapolis have long had communities along their riverfronts. Even as the cities grew in size and area, until they merged into a modern metropolitan region, people lived in small communities along the river. Some of these, such as the Upper Levee and the West Side Flats in St. Paul and the Bohemian Flats area of Minneapolis, were neighborhoods of squatters and others living on the margins of society, in the poorest, most flood prone, and least desirable areas of the riverfront. Other neighborhoods, notably the Highwood section of St. Paul, were designed as picturesque suburbs full of curving streets and with a rail connection to the city. Finally, there are residential areas within the study corridor, such as the Macalester-Groveland/Highland Park neighborhoods in St. Paul, where development has seemingly had little to do with the river.

River Transportation Era (1820-1862)

This section describes the principal population centers during the period that the river dominated transportation and follows with a brief account of settlement patterns in the corridor outside the population centers. The relation of towns to the river varied markedly, depending on their location. Above St. Paul and especially above St. Anthony Falls, the river was not widely used for commercial navigation, although small steamboats plied the river above Minneapolis during the mid to late nineteenth century. Each community, however, depended on the river, whether to transport people, goods, or raw materials, such as lumber. Writing in 1893 about St. Anthony, Isaac Atwater could have been speaking for any community in the region prior to the mid 1860s when he stated, "It is interesting now to recall how the river then dominated the town. It was everything. Every enterprise depended for its vitality on what the river could do for it."

The river transportation era in urban development began with the start of construction on Fort Snelling in 1820 and the subsequent founding of the American Fur Company post at Mendota in the 1820s. Traders erected seasonal posts at other locations in the corridor, but it was the mid-1830s before any permanent settlement took root. Prior to 1835, settlements clustered along the river were either military (Fort Snelling) or commercial (the fur post at Mendota). Commercial and military establishments brought people into a relatively confined space, but neither could be understood as cities. The Treaty of 1837 opened the east bank of the Mississippi, and within five years communities grew up at St. Paul and Cottage Grove. Urban growth received a burst of energy with the founding of St. Paul in 1841.

Settlement concentrated around Fort Snelling and St. Paul until the early 1850s, when a combination of factors led to widespread settlement throughout the corridor. The Treaties at Mendota and Traverse des Sioux in 1851 opened the west bank of the Mississippi to settlement, and the burgeoning steamboat trade brought thousands of settlers annually to Minnesota. As a result, new towns grew up at Anoka (1852), Hastings (1852) and Minneapolis (1854), as did towns that lasted for only a short while (Nininger and Pine Bend, for example). *(Figure 2.)*

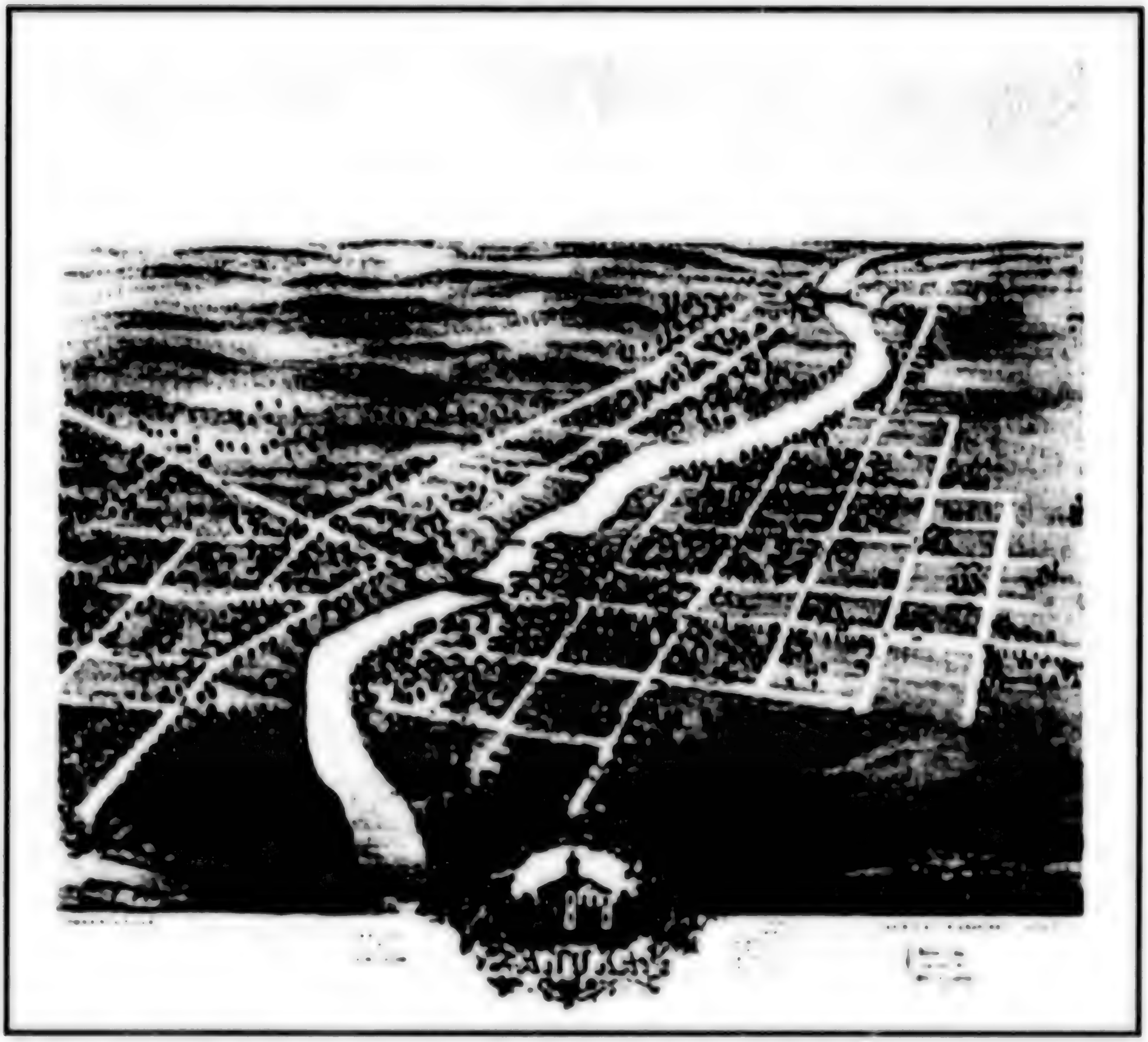


FIGURE 2. Panoramic Map of Anoka, 1869. American Memory Project, Library of Congress.

The Civil War and the Dakota Conflict of 1862 stalled new settlement in the early 1860s, but following the war, the population boomed and railroads spread across the region. The balance of the nineteenth century saw spectacular growth in short bursts within Minneapolis and St. Paul and steady growth throughout the portions of the corridor connected by railroad. Other places, such as the towns of Nininger and Pine Bend in Dakota County, were bypassed by the railroad and, as a consequence, died out by the end of the 1860s.

Throughout the river transportation period, residential settlement in concentrations that could be called urban was tightly focused at particular points along the river. St. Paul's town center ranged for several blocks on either side of the Upper and Lower Landings, but the rest of the present St. Paul riverfront was either unsettled or claimed by isolated farmers. The same pattern essentially held true upriver, with stretches of sparsely settled land separating Minneapolis and St. Anthony from upriver settlements such as Anoka and the cluster around Banfil's Tavern that would eventually become Fridley. These towns, as well as places like Hastings, remained relatively small centers during this period, established where the shore provided some natural amenity.

Much of the shoreline, according to early accounts, either was marshy and unsuitable for settlement or featured high bluffs facing the river. Places where small rivers or creeks joined the Mississippi provided natural settlement spots, as did, of course, the falls at St. Anthony. Concentrations of settlement during this period catered to the new farmers coming into the territory as well as to the lumbermen and traders. The settlements developed more or less according to the natural features of a particular location and the drive and initiative of the town's proprietors.

St. Paul can justly be called the first urban center in the MNRRA corridor. Legitimate settlement could begin only after the Dakota ceded their lands east of the Mississippi in the 1837 treaty. Some pioneers settled as early as the 1830s on sites across from the fort and as far north as the present Lake Street Bridge area. St. Paul started as a settlement just downstream from Fort Snelling, when officers in charge of that installation cleared it of non-military personnel in 1837. In 1837 and 1838 many of these refugees had settled near a marshy area just downstream from present St. Paul. This collection of domiciles was alternatively named for its topography ("Grand Marais" or Great Marsh) or for its best known inhabitant, Pierre "Pig's Eye" Parrant, a popular whiskey seller.

By 1841 more intentional settlers had joined the whiskey sellers and refugees from Fort Snelling and other settlements, and the community had moved to the bluff between the upper and lower landing. That same year, Father Lucien Galtier, a Catholic priest who had been sent from the Diocese of Dubuque to minister to the fur traders and growing community in the vicinity of Mendota, established a chapel on the bluff and named it for Saint Paul. The name stuck, and the community grew quickly and assumed regional importance as the closest landing to Fort Snelling, as well as the head of steamboat navigation on the Mississippi. When the Territory of Minnesota was established in 1849, St. Paul was one of three population centers. By the time Minnesota achieved statehood in 1858, it was chosen as the capital over the lumbering center at Stillwater and the milling and waterpower concentration at St. Anthony and Minneapolis.[illegible]

As St. Paul grew, settlement centered in three distinct areas, each with its own character and economic foundation. The so-called Lower Landing grew up just upstream of the marsh where Trout Creek and Phalen Creek entered the Mississippi. This area was the best natural steamboat landing in the settlement that was located outside the military reservation. The Upper Landing developed less than a mile upstream, below the current Irvine Park neighborhood. John Irvine began cutting timber for steamboats, as he and other settlers engaged in some small-scale shaping of the riverfront in order to create a levee and landing in this vicinity. The third area concentrated along the road that ran over the bluff separating the Upper and Lower Landings. This road, which became known as Third Street when the town was platted in 1847, became the first commercial center of St. Paul. Bench Street, which snaked down the bluff, and a set of stairs connected Third Street to the Lower Landing.

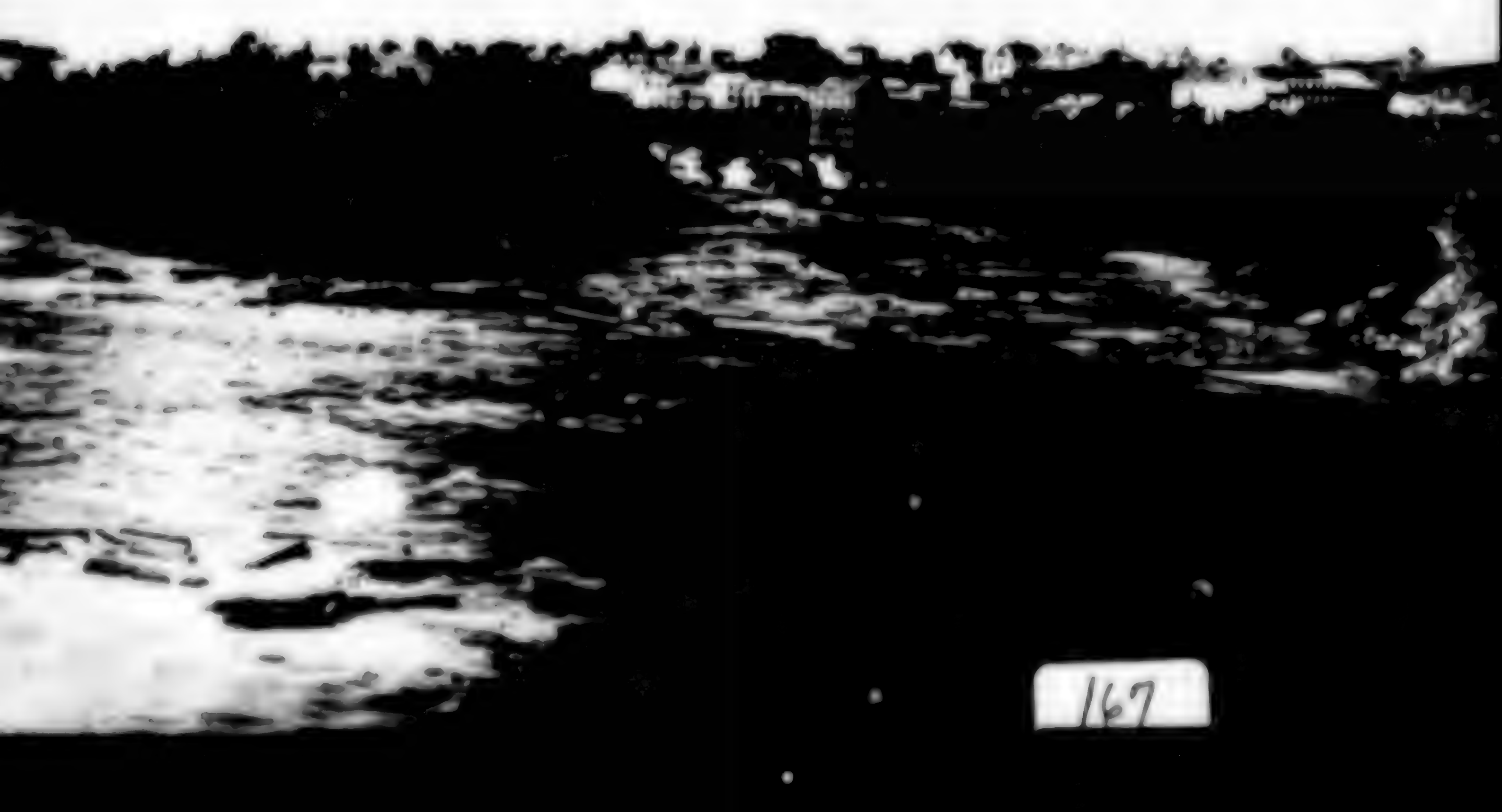
There were, of course, isolated houses, farms, trading posts, and whiskey shops located throughout the valley. Residential development grew up on the bluff downstream of the Phalen/Trout Creek lowlands as well, with Lyman Dayton establishing early plats on the bluff that still bears his name. All this settlement had visible impact on the landscape, as architectural historian Larry Millett, among others, has noted, "To make room for the growing city, ravines and bottom lands were filled, hills leveled, lakes drained, streams diverted, and bluffs shaved away"[illegible]

St. Paul was organized as a village on November 1, 1849, and incorporated as a city on March 4, 1854.[illegible] As a frontier town at the head of navigation in a rapidly expanding region, St. Paul's growth was explosive. Contemporary accounts from the middle 1850s document streets swarming with people unloaded from the several steamboats a week that arrived from downriver. Would-be settlers were warned to bring camping supplies, as a room or a house was not to be had for any price in the city. Although St. Paul never became a sawmilling center like Minneapolis or Stillwater, six sawmills grew up along the St. Paul riverfront to satisfy local needs. The economic contraction of 1857 stopped a period of tremendous growth, as it practically eliminated credit and made the already scarce hard currency more difficult to find. Industry in St. Paul during this period remained in its infancy. No railroads or associated facilities developed during this period, and St. Paul lacked the waterpower to attract industry, as at St. Anthony Falls.

The village of St. Anthony started on the east side of the river, near the sites claimed by Franklin Steele for their industrial potential, as soon as the land was opened to settlement in 1838. A store and sawmill were constructed on the east bank of the river in 1847-1848, and St. Anthony "boomed" with the establishment of the Minnesota Territory in 1849 and the opening of a suspension bridge, in 1855, to the settlement that became Minneapolis.[illegible] *(Figure 1.)*

St. Anthony was incorporated as a city on March 3, 1855, and a township was organized for the surrounding territory on May 11, 1858. The location saw a number of plats and names, however, including St. Anthony Falls Village (platted as part of Ramsey County in 1849 and a part of that county until March 4, 1856), and St. Anthony City platted in 1848-1849 and more popularly known as "Cheevertown."[illegible] "Cheeverstown," or "Cheever's Landing," was named for William Cheever, a New York native gifted

FIGURE 1. Village of St. Anthony, 1851, from downstream. Minnesota Historical Society.



with frontier entrepreneurship and a wry sense of humor. According to Atwater, Cheever acquired land below the University of Minnesota, "where he subsequently erected a farmhouse, and built an observatory on the high bank, over the entrance of which he placed the legend, 'Pay your dime and climb.'"[9] Some settlers reached the falls by stagecoach, although some did make it up the gorge on steamboats to Cheever's Landing.[10] Throughout the 1850s tourists from the South came to the Windsor House in St. Anthony for a respite from the sultry southern summers. It is probable that at least some of these travelers on the "fashionable tour" disembarked at Cheever's Landing rather than arriving by stage from St. Paul. The place took on a different aspect in winter, when, as Atwater later remembered it, "the Mississippi, its [St. Anthony's] only medium of connection with the outside world, was a dreary, trackless barrier of ice and snow."[11]

Minneapolis was founded by Colonel John H. Stevens, who operated a ferry above St. Anthony Falls. Stevens built the first house west of the Mississippi in this area in 1849. Platting for the town began in 1854, with the town government inaugurated on July 20, 1858. The city was incorporated on March 6, 1866. Among the most notable additions to the city (it did not achieve its present spatial extent until 1927) was the village of St. Anthony on February 28, 1872. The name "Minneapolis," combining "minne" from the Dakota for "water" and the Greek word "polis" for "city," apparently first appeared in print in November 1852. Charles Hoag, the reputed originator of the name, took it to George D. Bowman, editor of the St. Anthony Express, who publicized it.[12]

The riverfront in St. Anthony and Minneapolis was a mixture of residential, industrial and commercial land use. Housing appeared on Nicollet Island as early as the 1840s. In later periods, as riverfront land became more valuable, industrial uses crowded out all residential use, except in particularly undesirable areas such as Bohemian Flats. Unless buried by later activities, very little may remain from the earliest decades of development, particularly from the residential districts that lined the river until the railroads and expanding mills pushed them out.[13]

In 1850 Henry Bailly established Hastings, even though there had been no treaty relinquishing Indian title to land west of the Mississippi. Until the treaty could be ratified by the U.S. Senate (which would not take place until 1852), there could be no legal occupancy except by licensed fur traders. Knowing the potential of this site at the falls of the Vermillion River and its juncture with the Mississippi, Bailly obtained a fur traders' license and set up a post. The area had been known as "Oliver's Grove (sometimes erroneously shortened to "Olive Grove"), because Lt. William G. Oliver had stopped here when ice forced him ashore as he ascended the river in the fall of 1819.[14]

Once settlement started, the village grew rapidly. The first year of permanent settlement was 1853, and the following year entrepreneurs started a hotel, blacksmith shop, ferry, and established a wharf on the levee for shipping farm products. After its founders drew lots, the town received its name from the middle name of Henry Hastings Sibley, one of the leading citizens of territorial Minnesota. In 1855-1856, milling of flour and lumber began, using the power from the Vermillion River. According to Neill, 1856 marked the high point in this period of rapid growth. Between the opening of navigation and July 1, 73 stone and frame houses were constructed, along with 100 temporary structures. There was certainly the population to fill these buildings; the winter 1855-1856 census counted 1,918 people in Hastings, up from 650 the year before and a twentyfold increase over the 1854 population of about 100.[15] *(Figure 4.)*

In 1851 settlers established permanent housing and other improvements at Anoka, a former fur trading post near the junction of the Mississippi and Rum Rivers. The name "anoka" apparently derives from a Dakota term for "on both sides" and refers to the settlement's location on both sides of the Rum River at its junction with the Mississippi.[16] Brothers named Peter and Francis Patoille established a trading post at the point where a 15-foot drop in the Rum necessitated a portage on early trading routes.

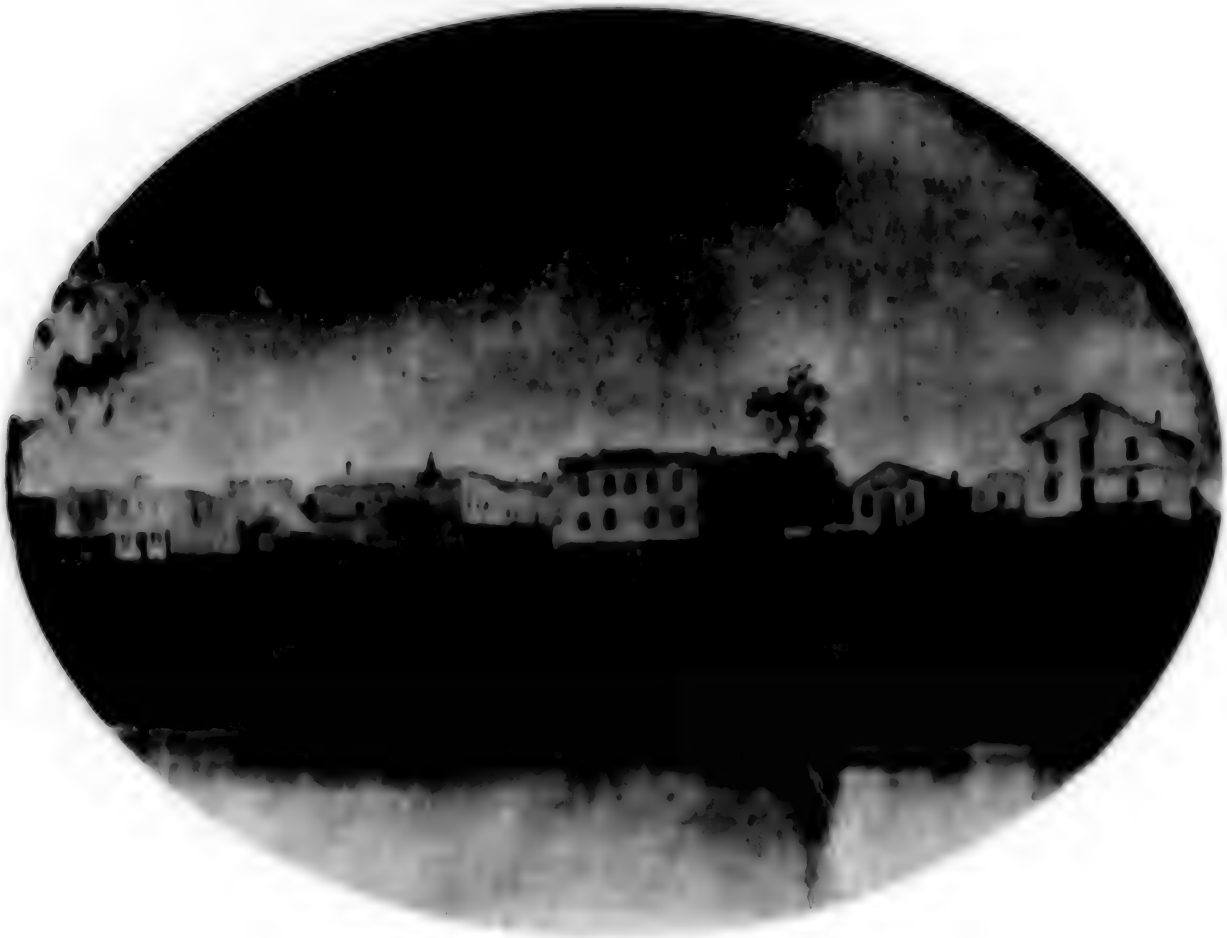


FIGURE 4. Hastings, 1850. Minnesota Historical Society.

In 1851 Henry M. Rice and his brother Orrin made permanent improvements, which by 1853 included a store and houses on the river's east side. A dam and sawmill soon followed, and in the mid 1850s the government built a bridge across the Rum. A flour mill was built at Anoka in 1854, and growing mill development throughout the 1860s attracted the attention of Minneapolis miller W. D. Washburn, who bought the complex around 1870.

Fridley has one of the more unusual political histories of any town in the corridor. John Banfil, the first state auditor and the first postmaster in this part of the state, established a tavern near the mouth of Rice Creek around 1848. A year later, Henry M. Rice became interested in the site and began farming nearby. The area was originally designated Manomin County by the territorial legislature in 1857. In 1870 residents petitioned to be added to Anoka County as a township, retaining the name Manomin, derived from the Ojibwa term for "wild rice." It received its present name only in 1879, for Abram McCormick Fridley. It remained largely agricultural throughout this period.

The town of Mendota is thought of by some as "the birthplace of Minnesota." Henry Sibley's stone home here, built in 1835, became a gathering place for politicians, artists, scientists, and adventurers. The settlement began as a commercial venture by the American Fur Company's Duncan Campbell, and became the central trading post for the region. Alexis Bailly, Sr., had charge of the post until 1834, when Sibley arrived. As distinctive as Mendota's history to about 1850 is, its subsequent story is less well known. In 1866 the railroad came through town, establishing an alternative transportation mode between the Minnesota River Valley and St. Paul and, for all practical purposes, eliminating Mendota's role as a regional trade center.

Grey Cloud Township lies on the east side of the Mississippi, just south of Cottage Grove. Grey Cloud is an island named for Mahkpia hoto win (Grey Cloud Woman), a significant Dakota woman from the fur trade era. Her husband, Hazen Mooers, operated a trading post on the island for a time, and it has been the site of sporadic native settlement and planned cities.

The city of Nininger, the site of which was in present day Nininger Township, is one of the most celebrated mid nineteenth century towns in Minnesota. Nininger attracted considerable attention from investors as far away as Chicago and New York City. The city was platted in 1856 and named for John Nininger, brother in law to Governor Alexander Ramsey and friend of the politician, author, and orator Ignatius Donnelly. Nininger and his associates "talked up" the city to the point that it had nearly 1,000 residents when incorporated in 1858. The booming community claimed seven to eight merchants, three to four blacksmiths and wagon shops, a plow factory, a sash and door factory, six saloons, three hotels, a drugstore, a physician and an unusually large assortment of lawyers and real estate dealers. By 1880, however, its population had declined to just 239, a loss attributed in part to the fact that the railroad bypassed the town and took regional growth to other cities (such as Hastings) and partly to the scarcity of hard currency on the frontier. These causes made Nininger only the most spectacular of the "boom and bust" cities in Minnesota's early years, or, as one writer put it, "The period of Nininger's founding and growth is an interesting, but not altogether unique, story."

The historic settlement pattern in Denmark Township, located in Washington County at the juncture of the Mississippi and St. Croix Rivers, resembles that of Nininger in some important respects, in that both are the locations of failed early cities. The causes of their demise are substantially the same—failure to attract a rail line and thus keep up with regional transportation patterns—but the particulars are different in important ways. The settlement center for Denmark Township was Point Douglas, settled in 1839 and named for Illinois Senator Stephen A. Douglas, but not formally platted until 10 years later. The post office established at that site in July 1840 was the oldest in Minnesota outside Fort Snelling. The village was an important early regional center "at that time and for a number of years the depot where all supplies were purchased for the interior." Like its downstream neighbor Hastings, Point Douglas became the location of both sawmills and gristmills, a ferry across the Mississippi River, and a hotel. As late as 1881, Point Douglas warehouses still held in excess of 100,000 bushels of grain, but the town did not develop the diverse commercial base that sustained Hastings. Much of the Point Douglas site lies outside MNRRA's boundary, but archeological and historic research is necessary to determine if a portion lies within the boundary.

Railroad Era (1862-1940s)

The railroad era comes with the emergence and then dominance of the railroad as the transportation system that served the Twin Cities area. After the first railroad line in Minnesota connected St. Paul and Minneapolis in 1862, the new transportation mode quickly expanded and took over the region's economy and defined its geographic development. The impact of the railroad's coming can hardly be overstated. It changed both form and function of particular spaces. St. Paul's Lowertown, for example, was formed from a wealthy residential neighborhood to the city's warehouse area, as the Lower Landing entered its prime period as a transfer point for goods onto rail cars headed for the prairies. Likewise, railroads filled the valley of Trout and Phalen Creeks to raise the rail bed out of the floodplain and afford trains an easier ascent up the slope north of the river.

As Nininger, bypassed by the railroad, withered and slowly died off as a population center, the rail transportation to Chicago spurred the 1886 creation of South St. Paul as a stockyard town. In fact, the story of South St. Paul may be seen as a microcosm of this period's developments. Although located on the Mississippi, the river was a secondary factor in the city's development and transportation network. Cattle came in and meat went out by rail. Meat processors did, however, employ the river to carry away animal wastes.

At the beginning of the railroad era, the population distribution within the corridor was centered in the cities of Minneapolis and St. Paul. Minneapolis in 1865 was home to approximately 4,700 people, while St. Paul's population stood at approximately 13,000. The railroad era saw these two cities grow explosively, in a series of "booms" followed by periods of relative stability. Between 1865 and 1880, Minneapolis grew from 4,700 to 47,000, while St. Paul's population tripled to more than 41,000. By 1900, St. Paul had quadrupled again to 163,000, while Minneapolis had grown even faster to 202,000.

With the establishment of railroads, land uses along urban riverfronts changed dramatically, as industrial and commercial uses replaced residential land uses. In part, this was a matter of economics: riverfront land became too valuable for housing. In part, it was a matter of aesthetics: riverfront land was too close to dangerous and dirty industrial developments for all but the very poorest inhabitants. And, in part, the transition was a measure of the growing centralization of regional transportation patterns on the railroad. By the turn of the century, river navigation (other than timber) had all but ceased, and railroads were carrying passengers and freight from Minneapolis and St. Paul to destinations all over the region.

In addition to altering land use patterns in existing urban areas, the development of rail networks throughout Minnesota served to centralize the population. Hamlets off the rail alignment withered, disappeared or moved to more favorable locations on the new lines. Moreover, the development of shops and other ancillary functions in some cities and towns guaranteed a certain level of employment and economic development. The result was the elimination of numerous small hamlets along the river and the concentration of population and economic resources in fewer places.

Within the city of Minneapolis, river-oriented residential development concentrated in three areas and emerged at different times. The "Gateway Residential Complex" at the west end of the Hennepin Avenue Bridge grew up with the emergence of Minneapolis in the 1850s. It was moved out by the 1880s, as railroads and other industrial land uses came to dominate the riverfront at the falls. Joseph Stipanovich has written that Poles lived along the riverfront in northeast Minneapolis and that residential districts emerged along the river in north Minneapolis, as workers moved close to their places of employment in the sawmills.

The most romanticized community along the riverfront in Minneapolis was "Bohemian Flats," located on the river bottom flats below the University of Minnesota West Bank campus (*Figure 6, following page*). The flats community emerged in the 1880s and existed until the city cleared the land of residences in the early 1930s. Many in this neighborhood subsisted on wages earned at nearby breweries, liberally supplemented by gathering lumber and logs that had washed over the falls from the dozens of sawmills upstream (*Figure 5*). According to Millett, a skilled gatherer could pull in as much as 300 cords of wood in a good year.

Although termed "bohemian," in fact, people of many nationalities lived in the small collection of wooden houses

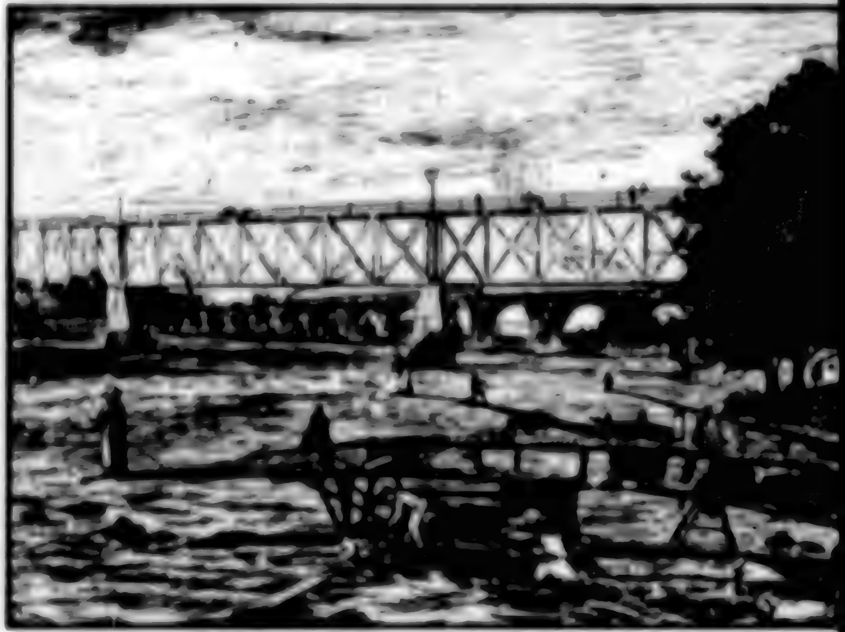


FIGURE 5. Gathering wood at Bohemian Flats, 1887. Minnesota Historical Society.

along dirt streets running parallel to the river. Regular spring floods kept investment in larger buildings to a minimum, although the flats still boasted a church, a store and other nonresidential buildings. The St. Anthony Water Power Company owned the land at Bohemian Flats and in the 1880s rented house lots for $12 per year.

With 1,200 people by 1900, Bohemian Flats probably ranked as the largest river flats settlement in the MNRRA corridor, including the Italian neighborhood on the Upper Levee in St. Paul and the community of, first, Jewish and, later, Latin American residents on St. Paul's West Side. All these communities shared a common history and spatial arrangement. Home to the poorest and most recent of the area's immigrant populations, they typically featured small wooden houses, board fences, cows, some stores, saloons, perhaps a brick apartment building (where investors felt the floods would not harm them) and quite often a church. The river flats settlements grew most rapidly during the regional population and economic boom of the 1880s. By and large, these settlements disappeared with various urban renewal schemes after World War II. Minneapolis cleared most of Bohemian Flats during the 1930s, when it began plans for a municipal barge docking facility on the site. Not until 1963, however, did the last resident vacate the flats, allowing it to become a coal terminal.

The railroad period saw a mixed pattern of residential development away from the downtown center in Minneapolis. For the most part, however, the riverfront upstream from St. Anthony Falls was industrialized by the 1890s. Rising land prices pushed out even prosperous owners with large houses. Immediately around the falls, the land use conversion was total. Nicollet Island became the site of fashionable homes beginning in the 1870s, but gradually the island became separated into distinct industrial, commercial, and residential zones. Industrial development completely replaced the large houses along the bluffs on the river's west side, just below the falls, by the 1880s.

FIGURE 6. Bohemian Flats, 1880. Minnesota Historical Society

Further downstream from the falls, residential development assumed a middle class look. Beginning in the 1880s, at the suggestion of the renowned landscape architect H.W.S. Cleveland, the Minneapolis Park Board began buying tracts of land along the river between Riverside Park (near the present University of Minnesota West Bank campus) and Minnehaha Park to the south.[illegible] The presence of parkland, coupled with the topographical pattern that put the river at the bottom of a 100 foot gorge, helped create an attractive neighborhood. This area, comprising the present Seward, Longfellow, and Cedar Riverside neighborhoods on the west side of the river, remains poorly understood in terms of its precise historical development.

A number of distinct river communities also developed within St. Paul during the late nineteenth and early twentieth centuries. The Upper Levee and West Side Flats both solidified and expanded during this period, as earlier scattered settlement saw a large population influx in the 1880s *(Figure 7)*.[illegible] Both of these communities originated as squatter settlements on land unattractive to anyone who could afford to live elsewhere. In contrast, the Donnelley atlas of 1892 shows platted subdivisions in the Highwood area, with curving streets indicating either a steep bluff or an intent for a picturesque suburban enclave. Although full development of Highwood would only come after World War II, its origins as a settlement began as a railroad era amenity suburb that took advantage of the views offered from the bluffs south of downtown St. Paul and from the Daytons Bluff neighborhood.[illegible] Farther north along the river in St. Paul, near the border with Minneapolis, the Merriam Park neighborhood became established. Like Highwood and Reserve Township immediately to the south, Merriam Park was annexed by the city in 1887, bringing St. Paul approximately to its current spatial extent. Reserve Township, currently the St. Paul neighborhoods of Macalester Groveland and Highland Park, was organized in 1858 but remained largely farmland until the 1950s.[illegible]

Writing in 1875, St. Paul historian J. Fletcher Williams summarized St. Paul's evolving relation to the river: "of late years, the opening of navigation has ceased to be of any importance or interest. Our railroads have changed all that." St. Paul early established a rail connection to the Minnesota River valley and from there to the opening wheat fields of the Red River Valley and the Dakotas.[illegible] This period saw other changes in St. Paul's relation to the river as well. Dr. Justus Ohage purchased Harriet Island (government lot 6) from 20 landowners and conveyed it to the city in 1900 for public recreation. At Harriet Island's opening on June 9, 1900, the 40 acre island had paths, two pavilions, and a bathhouse. In 1929 the island and its facilities were transferred to the St. Paul Parks Department, and subsequent work on the island by Depression era public relief crews included the construction of the existing pavilion, designed by St. Paul's city architect Clarence W. Wigington.[illegible]

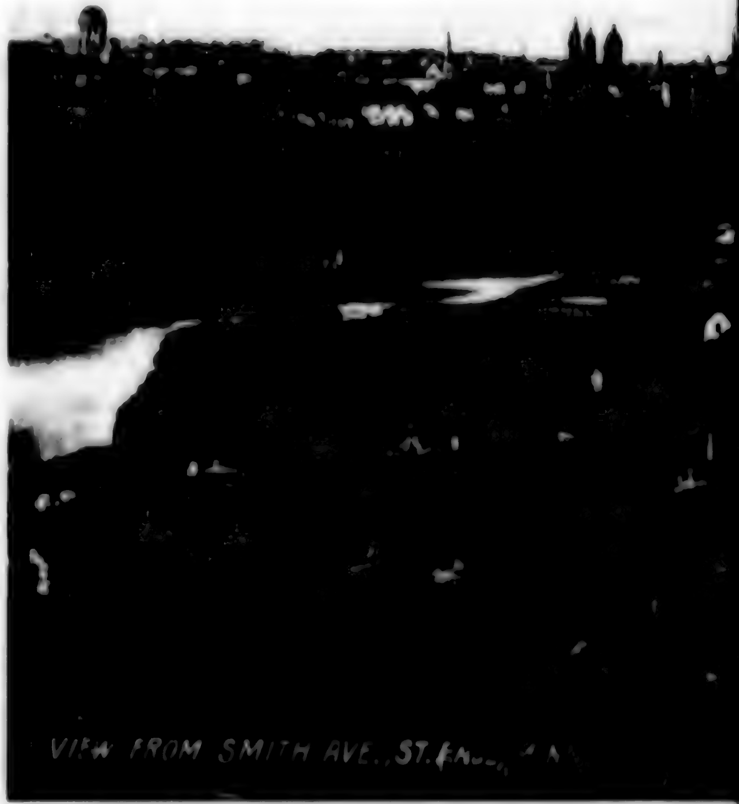


FIGURE 7. Little Italy on the Upper Levee, St. Paul, 1908. Minnesota Historical Society.

Atlases of Minneapolis and St. Paul, which began to be published more systematically in the 1880s, give a sometimes misleading picture of residential growth during this period. Often riverfront areas are shown as platted, when in fact housing was not built until much later. For example, Crosby Farm, located on the floodplain below present day Highland Park in St. Paul, was platted in 10 acre lots early in the twentieth century, although the farm had very little non farm development at the time it was made part of the city's park system in the 1950s.[18]

During the railroad era, land use and residential patterns became more economically and socially stratified. Industry took over much riverfront, particularly near the downtowns of St. Paul and Minneapolis. With industry came noise, disagreeable smells, and danger, to add to the seasonal threat from floods. Historian Larry Millett describes the resulting class separation

> *The hierarchy of altitude was especially strong in the Twin Cities in the late nineteenth century. While the rich resided in their mansions on Summit Hill in St. Paul and Lowry Hill in Minneapolis, the poorest Twin Citians were tucked away (out of sight and mind) in deep holes like Swede Hollow or on the floodplains below the river bluffs. Isolated from the city by barriers of language, culture, and geography, these enclaves were often identified with a particular ethnic group, although most were actually quite diverse in their makeup.*[19]

Historical geographers David Lanegran and Paul Donald Hesterman argue that the river assumed a double character to area residents during this period. For the wealthy, who could afford to move uphill away from the grime and danger, the river became an aesthetic amenity, with river views a large part of the attractiveness of places such as St. Paul's Summit Avenue. Yet areas close to the river grew unattractive and became the home of the city's poorest residents. Enclaves such as Nicollet Island in Minneapolis, where an upper middle class community flourished in the midst of the chaos of the St. Anthony Falls industrial area, seemed the exception to the rule. The relative isolation of the island, perched on a limestone shelf out of the reach of all but the highest floodwaters, may have contributed to its anomalous position.[20]

Outside the major cities of St. Paul and Minneapolis, several fairly distinctive patterns began to emerge. Some locations did not adapt to the new transportation system and declined during this period. Some places that had early assumed regional prominence retained some importance but began to be overshadowed by Minneapolis and St. Paul. Hastings serves as a prime example of this pattern. Other places, such as Richfield (which once bordered on the river) and Newport, assumed a distinctive importance in relation to the central cities, often as vacation spots. Yet other cities, such as the industrial town of South St. Paul, emerged during this period as a direct response to the new railroad transportation pattern.

Edward Duffield Neill's History of Dakota County and the City of Hastings (1881) provides a vivid sketch of

Hastings at that point in its history. Hastings certainly impressed Neill (or whoever was actually conducting the research on the town; see endnote 2), as it had attained a population of some 4,000 within three decades of its establishment. The city had an air of enduring permanence; as the writer noted, "It appears to the eye as if having been endowed with perpetual prosperity and as if having always existed in the same form as today . . . It is a type of western achievement." Impressive though that achievement may have been, the writer felt that it could have been greater: "It is scarcely doubtful, that that city (Hastings) would have had a much greater growth without them (railroads)." Thus, within 50 years of the first permanent American settlement in the MNRRA corridor, new transportation systems were creating "winners" and "losers" among the region's communities as they vied for prominence.

Some places in the MNRRA corridor that grew up during the last third of the nineteenth century achieved their greatest visibility as satellites of the larger cities. Richfield, a farming township that had been established in 1858 with the rest of the corridor west of the river, became a tourist attraction in the 1880s. Hotels, landscaped gardens, a new railroad depot (the "Princess Depot") and pleasure drives all lined the vicinity of the river near its junction with Minnehaha Creek. Now part of the city of Minneapolis, the area surrounding Minnehaha Falls became a formally designated park in 1885. There was a different impetus for growth in what is now the community of Newport. Originally the site of a mission to the Dakota (1837-42), a railway village called Red Rock grew up there in the 1860s. In 1869 the village became the site of summer religious revivals held by the Red Rock Camp Meeting Association, an affiliate of the Methodist Episcopal Church. Red Rock derived its name from a five-foot-long red rock, painted with stripes and venerated by the Dakota during their residence in the area. The rock was formerly on the bank of the river; it was moved in the early twentieth century to a point near the railroad station.

Railroads, by allowing the rapid transport of freshly cut meat, made South St. Paul one of the winners. Alpheus Beede Stickney of St. Paul formed the Minnesota and Northwestern Railroad to establish a line between St. Paul and Iowa, which would then connect to lines running to Chicago. When the line opened in 1885, the trip between St. Paul and Chicago was reduced to 13 hours, 30 minutes. The railroad and the river location just downstream from St. Paul were an important part of the marketing of "South Park," as the residential development was initially called. Dakota County gave land for industry, particularly car shops for the railroad. With James J. Hill as one of his backers, Stickney incorporated the St. Paul Union Stockyards on June 30, 1886, with the stockyards to be built on 260 swampy riverfront acres that needed to be filled before construction could take place. Separating from West St. Paul Township, South St. Paul was formed in 1887 and saw a period of rapid growth in the 1890s, as its stockyards expanded to include meat processing and slaughterhouses.

The Modern River

Automobiles increasingly defined the urban and suburban landscape after World War II. Since the general end date for this study is about 1950, this era is not examined in depth. The central purpose of this study has been to provide the context for sites that could merit inclusion in the National Register. Unless sites are of exceptional significance, they must be older than 50 years to be listed on the Register. This means that most properties constructed after the early 1950s are not yet eligible. Nevertheless, a few comments are in order. (*Figure 8.*)

After World War II, the fabric of urban settlement in the river corridor underwent significant change, as the combination of growing population and developing regional highway systems pushed population rapidly away from the central cities. This development, popularly characterized as "sprawl," was responsible for the conversion of farm country in places such as Coon Rapids into acres of suburban development. At the same time, the residential pattern that Lanegran and Martin call "suburban in city" filled in the

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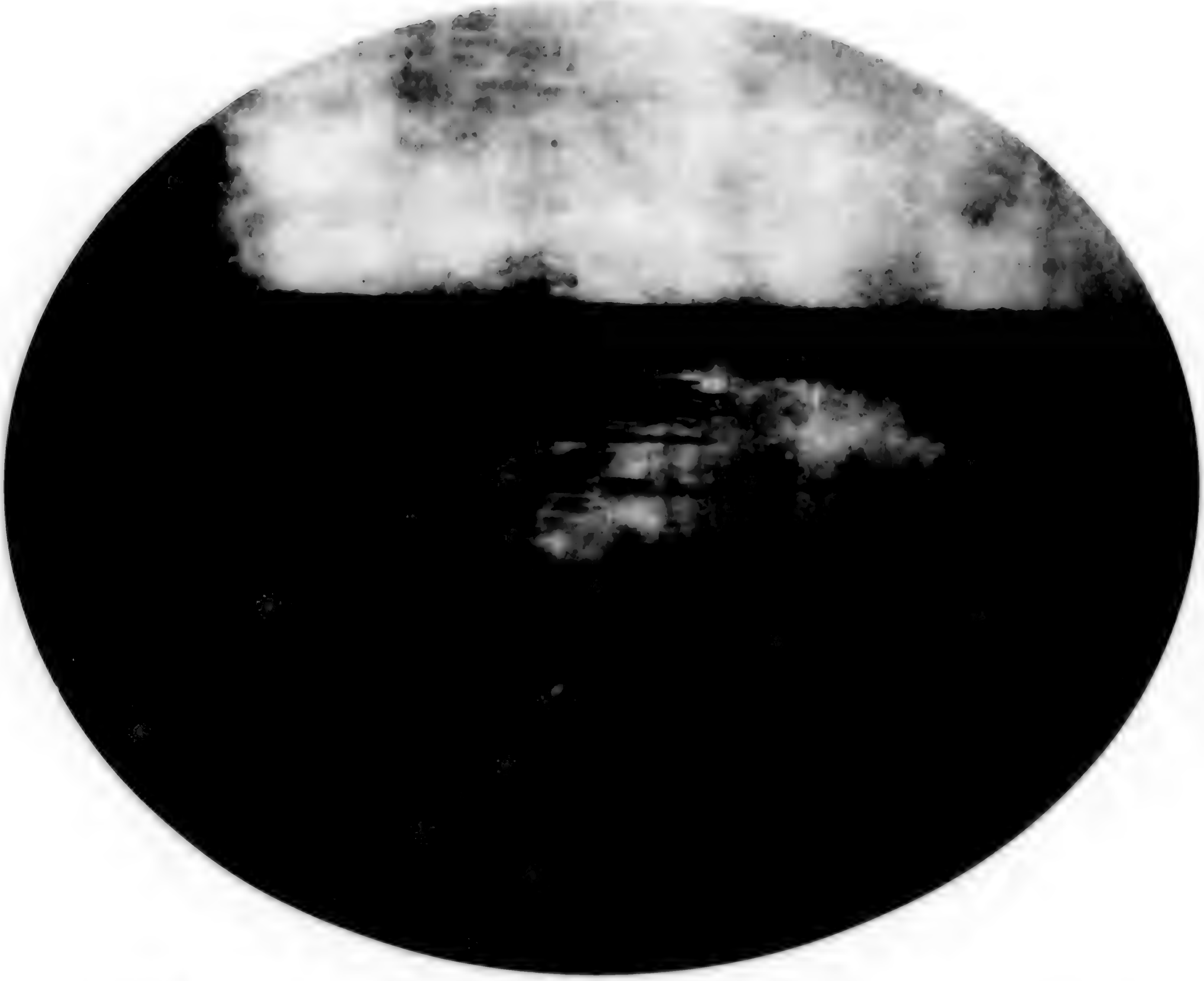

FIGURE 1. Contemplating the river. Wingdams below Nininger, Minn., 1891. Photo by Henry P. Besse. Nininger lies just above Hastings, on the west side of the Mississippi River.

Epilogue

Novel and Familiar Places

The Dakota warriors who beached their canoes at the mouth of Phalen Creek, below Daytons Bluff, in 1680, added another story to a deeply storied place. They landed in the shadow of ancient Native American burials on the bluff above and just upstream of the future village site of Kaposia, which their descendants would inhabit over a century later. Their French captives heralded the coming of Europeans, the impending transformation of the river and the addition of many more stories. Neither the Dakota nor the French could have imagined the fill, buildings, mills, railroad yards, and roads that would obliterate Phalen Creek.

Hundreds of places that harbor stories as rich and deep lie throughout the MNRRA corridor. When identified, preserved and interpreted, they possess the power to evoke a sense of romance and adventure, disgust and regret, amazement and community pride. They are places with the ability to teach children and adults about how the environment, landscape and economy of the place in which they live or are just visiting came to be, about what has been lost and what has been gained. They are places that define the identity of many communities within the MNRRA corridor. This study has identified many such places, but many others remain to be discovered and have their stories told.

Mis-Placed

People care most about places they can relate to. Unfortunately, too many people have forgotten what their connection to historic sites within the corridor is, or have not had the opportunity to learn about them. Some people may be new residents, from some other city, state or country. Or, the people who had the direct connection may have passed away long ago. The more historically distant a place or event is, the harder people may find it to connect to that place. They cannot feel the sense of place people who once lived there felt. In many cases direct connection is no longer possible. No jobs for log drivers remain. The water-powered flour and timber mills are gone, as are the Dakota villages, the natural river and the natural falls. People today cannot imagine the anticipation and excitement generated by the arrival of the first steamboat at Hastings or St. Paul or Anoka in the 1850s. (Granted, the more ancient a place is, the more romantic or mysterious many people find it.) The challenge today is to recover a sense of place, a sense of continuity. The evaluation, preservation and interpretation of historic sites and places offer a way to meet this challenge.

Recovering a Sense of Place

For residents of the Twin Cities metropolitan area, the MNRRA corridor is like a big, old house. It has many familiar rooms that they visit often and know intimately. Other rooms they do not know as well. Some contain deep closets that they have never explored. Some hide old trunks, treasure chests, that they have yet to open. Each one reveals more about the people who have lived in the house. The smells each one emits, the texture of old clothes, the sight of tattered pictures of people they know, though much younger, and people whose names and faces are a mystery give them a deeper appreciation of the place they call home. The sounds of an old record (if they can find a place to play it) bring alive the voices and culture of another time. Their place is more than they knew it to be, and they value it more. By their association with the contents of each trunk they are more than they thought they were.

The MNRRA corridor holds places with stories that can evoke all the senses. Imagine the sights and sounds of the glacial River Warren as it plummeted over its limestone bed in St. Paul some 12,000 years ago. People can see that limestone strewn along the valley floor or hanging at the bluff tops through much of the valley below St. Anthony Falls. They can walk up and touch it. They can crumble in their hands the fragile St. Peter Sandstone that underlies the limestone and allowed the falls to retreat. They may not want to imagine the smell of a river so rancid a person would bury her nose in her coat when passing by. Yet by remembering, they may commit themselves to making the Mississippi River cleaner and healthier. Try to imagine the river "free from everything that would render it impure, either to the sight or taste," as Stephen Long described it in 1817.

People can learn to appreciate what a place meant to someone long ago, and in doing so discover that a place holds a richer and deeper meaning than they had thought. David Glassberg, in his article "Public History and the Study of Memory," suggests that "By and large tourists look for novelty in a landscape, what is not back home, whereas local residents look at the landscape as a web of memory sites and social interactions." Historic sites and landscapes in the MNRRA corridor possess the novelty to reward tourists for leaving their armchairs and the continuity to ground residents new and old.

Glassberg contends that "History offers ways . . . to orient oneself in the environment." Different types of historic sites, he says, "connect stories of past events to a particular present environment." He uses environment in the broadest sense, meaning one's surroundings. For people sitting on the riverbank anywhere along the corridor, the environment they see is far different from that which existed one hundred years ago (*Figure 1*). Residents and visitors are surprised to learn that their predecessors could wade across the Mississippi during low water. The idea of a steamboat with a draft of only 24 inches grinding on a gravel bar near St. Paul or Zebulon Pike walking his boats up the shallow, frigid October river above St. Anthony Falls seems far fetched. They see the river rise during floods, but they do not comprehend how the dams keep it from falling to its natural low water stage. People have forgotten why navigation boosters pressed so hard to change the river. And they may not understand what has been lost and what has been gained. Understanding historic sites and their historical contexts is not just about neat places; it is about understanding how we got to where we are today.

Place stories reveal how the area's relationship to the river has changed over the centuries. As the relationship between the Mississippi River and its inhabitants evolved, people treated it differently, and their concern for how they treated it changed. To the Dakota, the river was a highway and a source of natural resources, which they did not take for granted. The river and places along it, the Red Rock and St. Anthony Falls, for example, possessed spirits they prayed to. Steamboat pilots offered their own prayers to a river they believed had superhighway potential if adequately transformed. Lumber and flour millers valued the river as a transportation route and for the waterpower offered, and not just at St. Anthony Falls but throughout the corridor. Transforming the river's physical and ecological character was unquestionably good to them. To railroad builders, the river valley offered a level grade but little more. People began turning their backs to the river. It became a convenient gutter for their mounting quantities of personal and industrial wastes. As people fouled the river, they tried to get even farther away. The beaches and bathhouses at Harriet Island closed. Few could stand the stench assaulting them if they tried to boat on the river, and some found it difficult to drive near it. To the residents of Little Italy, the West Side, Bohemian Flats and other floodplain communities, the polluted river meant cheap land. They stayed by it, weaving new stories. When Locks and Dams 1 and 2 stopped the pollution from flowing away, St. Paul became the first city on the Mississippi River to build a sewage treatment plant–on the village site of Kaposia. As the water has improved, people have turned to face the river again. A new view of the river is evolving, and the river's history is playing an important role.

Glassberg believes that the river's history can help "residents and visitors alike to see what ordinarily cannot be seen: both memories attached to places and the larger social and economic processes that shaped how the places were made." Here Glassberg is referring to the historic context of a place. Because it would be impossible for this study to detail the individual history of each historically important place, the focus has been on the historic contexts within which many places in the MNRRA corridor gain their historical significance. The Mississippi River we see, hear, touch, smell and taste (many Twin Cities residents drink river water from their taps) is defined by past social and economic processes and by the people caught up in those processes. This is true of the land along the river as well.

This historic resources study reveals the great variety and depth of historic places within the corridor. It is just a beginning. Communicating the stories of these places to the corridor's visitors and residents in a way that helps them connect to the river is an important and challenging task. Identifying and preserving important historic sites and places so that the National Park Service and others can interpret them is equally important and challenging. As Congress found and as this study has reinforced, the MNRRA corridor holds many "nationally significant" historical and cultural resources. Because of their significance, Congress declared that "There is a national interest in the preservation, protection, and enhancement of these resources for the benefit of the people of the United States." Through research, management and protection of historic resources, and with interpretation, the National Park Service can help MNRRA communities better celebrate their unique and common heritage and share that heritage with regional, national and even international audiences.

Fig. E. 3. Detail, Wingdam below Nininger, Minn., 1891. By Henry P. Bosse. St. Paul District, Corps of Engineers.

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Chapter 2

1 This discussion is structured using historic contexts for the precontact and early contact periods developed for the Minnesota State Historic Preservation Office. Unless otherwise noted, information presented here has been drawn from these contexts and other important sources on regional Native American history. Clark A. Dobbs, "Outline of Historic Contexts for the Prehistoric Period (ca. 12,000 B.P.–A.D. 1700)," a document in the series *Minnesota History in Sites and Structures: A Comprehensive Planning Series*, Reports of Investigation No. 37, prepared for the Minnesota State Historic Preservation Office, St. Paul. Minneapolis: Institute for Minnesota Archaeology, 1990. Clark A. Dobbs, "Historic Context Outlines: The Contact Period Contexts (ca. 1630 A.D.–1820 A.D.)," a document in the series *Minnesota History in Sites and Structures: A Comprehensive Planning Series*, Reports of Investigation No. 37, prepared for the Minnesota State Historic Preservation Office, St. Paul

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29 Pond, "Narrative," pp. 47-50; Anderson, *Kinsmen*, pp. 63-64.

30 Folwell, *Minnesota*, pp. 67-68.

31 Lass, *Minnesota: A History*, p. 82; Anderson, *Kinsmen*, p. 79; Roy W. Meyer, *History of the Santee Sioux: United States Indian Policy on Trial* (Lincoln: University of Nebraska Press, 1967; reprinted 1980), p. 24.

32 Zebulon Pike, *Sources of the Mississippi and the Western Louisiana Territory* (Ann Arbor, Michigan: University Microfilms, Inc., 1966; from Zebulon Pike, *An Account of Expeditions to the Sources of the Mississippi*, Philadelphia, Pennsylvania: C. & A. Conrad & Co., 1810), pp. 1, 14, 22-24.

33 Ibid., pp. 23-24.

34 Ibid., pp. 24-26; Meyer, *Santee*, pp. 25-26; Anderson, *Kinsmen*, p. 80. Le Fils de Pinchow or Pinichon was the leader of a village up the Minnesota River that had once been headed by Wabasha. Wabasha had left this village to go to the Mississippi River. Meyer, *Santee*, p. 25.

35 Pike, *Sources of the Mississippi*, p. 24.

36 Ibid., pp. 29-30; quote p. 30.

37 Ibid., pp. 30, 93-94; quote p. 93.

38 Ibid., p. 28.

39 Ibid., p. 93; see pp. 92-93 for full statement.

40 Anderson, *Kinsmen*, pp. 84-85.

41 Anderson, *Kinsmen*, pp. 87-91; Lass, *Minnesota: A History*, p. 83.

42 On page 79, Anderson, *Kinsmen*, says that the tribe "had undergone considerable change over the two decades since Ainse's visit." Then, on page 81, he says that overall the eastern Sioux population and lifestyle remained essentially the same between the time of Pond and Ainse and Pike. This captures the dilemma many Native American historians faced. They had to acknowledge that important changes occurred as a result of European and American expansion, and yet, important parts of the Native American way of life stayed the same.

43 Pond, "Narrative," pp. 44-56.

44 Pond, "Narrative," p. 56; Anderson, *Kinsmen*, p. 79.

45 Anderson, *Kinsmen*, quote p. 81; see pp. 80-81.

46 Lass, *Minnesota: A History*, p. 84.

47 Anderson, *Kinsmen*, pp. 92-95.

48 The account of Long's effort to beat Pike comes from William H. Keating's narrative of Long's 1823 expedition. See William H. Keating, *Narrative of an Expedition to the Source of the St. Peter's River, Lake Winnepeek, Lake of the Woods, &c. Performed in the Year 1823 by the Order of the Hon. J. C. Calhoun, Secretary of War under the Command of Stephen H. Long, U.S.T.E.*, p. 297.

49 Lucile M. Kane, June D. Holmquist, and Carolyn Gilman, edited, *The Northern Expeditions of Stephen H. Long: the Journals of 1817 and 1823 and Related Documents* (St. Paul: Minnesota Historical Society Press, 1978), p. 66.

50 Keating, *Narrative*, pp. 297-98.

51 Kane, *Northern Expeditions*, pp. 65-67; quote p. 66.

52 Ibid., p. 67.

53 Kane, *Northern Expeditions*, pp. 67, 68-69. For an account of what happened to Carver's Cave, see Charles J. Burnley, "Case of the Vanishing Historic Site or What Happened to Carver's Cave?" Ramsey County History 4:2 (Fall 1967): 8-12.

54 Keating, *Narrative*, p. 300.

55 Kane, Northern Expeditions, pp. 68-69; quote, p. 68. For an in-depth history of Fountain Cave, see Greg Brick, "St. Paul Underground: What Happened to Fountain Cave—the Real Birthplace of St. Paul?" *Ramsey County History* 29:4 (Winter 1995): 4-15.

56 Anderson, *Kinsmen*, pp. 95-96; see footnote 68 on O'Fallon's account.

57 Ibid., pp. 96-98.

58 Anderson, *Kinsmen*, pp. 99, 101-02; Lass, *Minnesota, A History*, p. 84; Folwell, *Minnesota*, p. 140.

59 Folwell, *Minnesota*, pp. 138-40; Lass, *Minnesota, A History*, p. 86; Steve Hall, *Fort Snelling: Colossus of the Wilderness* (St. Paul: Minnesota Historical Society Press, 1987).

60 Anderson, *Kinsmen*, p. 101.

61 Ibid., pp. 103-04.

62 Keating, *Narrative*, pp. 102-03.

63 Anderson, *Kinsmen*, p. 106; Gary Clayton Anderson, *Little Crow, Spokesman for the Sioux* (St. Paul: Minnesota Historical Society Press, 1986), p. 22.

64 Anderson, *Little Crow*, pp. 25-26; Willoughby M. Babcock, Jr., "Sioux Villages in Minnesota prior to 1837," *Minnesota Archaeologist* 12 (October 1945): 136.

65 Anderson, *Kinsmen*, pp. 107-10, 130; Idem., *Little Crow*, p. 29.

66 Quoted in Anderson, *Kinsmen*, p. 128.

67 Anderson, *Kinsmen*, Chapter 7; Babcock, "Sioux Villages," p. 137.

68 Anderson, *Kinsmen*, pp. 155, 158.

69 Ibid., pp. 159-60, 162, 165-66, 174-76.

70 Babcock, "Sioux Villages," p. 137, argues that those who say Kaposia moved after the 1837 treaty are wrong. "Taliaferro's list of 1834," he insists, "shows this chief (Wakinyantanka) as head of the Kaposia band, 'West of the Mississippi and 9 miles below Fort Snelling.'" Furthermore, he contends, "The Taliaferro list of 1834, however, reinforced by his similar locating of the band on his manuscript map of 1835, prove conclusively that the removal took place prior to 1834." Although he writes after Babcock, Anderson, *Little Crow*, pp. 30-32, suggests that Little Crow III (Wakinyantanka or Big Thunder) moved Kaposia across the river in 1838 as a result of the 1837 treaty.

71 Anderson, *Little Crow*, p. 56.

72 Anderson, *Kinsmen*, pp. 180-82, 184-87; Idem., *Little Crow*, pp. 60-61.

73 Anderson, *Little Crow*, p. 61.

74 Ibid., p. 62.

75 Anderson, *Little Crow*, pp. 61-63; Idem., *Kinsmen*, pp. 187-89.

76 Anderson, *Kinsmen*, p. 189; Idem., *Little Crow*, p. 64.

77 Anderson, *Little Crow*, pp. 65, 66; Idem., *Kinsmen*, pp. 189.

78 Anderson, *Little Crow*, pp. 66-67; Idem., *Kinsmen*, pp. 192-94.

79 Anderson, *Little Crow*, pp. 69-75.

Chapter 4

1 David A. Lanegran and Anne Mosher Sheridan, "The European Settlement of the Upper Mississippi River Valley: Cairo, Illinois, to Lake Itasca, Minnesota, 1540 to 1860," in John S. Wozniak, ed., *Historic Lifestyles in the Upper Mississippi River Valley* (New York: University Press of America, 1983), pp. 23-25; Tweet, *A History of the Rock Island District, U.S. Army Corps of Engineers, 1866-1983* (Washington: U.S. Government Printing Office, 1984), p. 39; William J. Petersen, *Steamboating on the Upper Mississippi* (Iowa City: The State Historical Society of Iowa, 1968), pp. 206-09, 209, 246; William J. Petersen, "Captains and Cargoes of Early Upper Mississippi Steamboats," *Wisconsin Magazine of History* 13 (1929-30): 227-32; Mildred Hartsough, *From Canoe to Steel Barge* (Minneapolis: University of Minnesota Press, 1934), pp. 65-66; Roald Tweet, "A History of Navigation Improvements on the Rock Island Rapids" (Rock Island District, U.S. Army Corps of Engineers, April 1980): 2. John O. Jensen, "Gently Down the Stream: An Inquiry into the History of Transportation on the Northern Mississippi River and the Potential for Submerged Cultural Resources," *Wisconsin Archeologist* 73:1-2 (March-June, 1992): 71, says that only about 20 boats were operating above Galena before 1847. Military supplies and furs would dominate the much smaller steamboat trade above Galena.

2 George Byron Merrick, *Old Times on the Upper Mississippi: The Recollections of a Steamboat Pilot from 1854 to 1863*, Appendix B, Opening of Navigation at St. Paul, 1844-1862 (St. Paul: Minnesota Historical Society Press, 1987), p. 295. Merrick lists the number of arrivals and the number of boats at St. Paul for each of these years. His figures for arrivals differ slightly from those of Dixon in Table 2.1. He lists 99 boats counting for 965 arrivals in 1857 and 62 boats as accounting for the 1,090 arrivals in 1858.

3 Hartsough, *Canoe*, p. 103.

4 Ibid., pp. 101-2.

5 Merrick, *Old Times*, p. 162, says that "From 1852 to 1857 there were not boats enough to carry the people who were flocking into the newly opened farmers' and lumbermans' paradise."

6 Roald Tweet, *History of Transportation on the Upper Mississippi & Illinois Rivers* (Washington: U.S. Government Printing Office, 1983), 21-22; Petersen, "Captains and Cargoes," 228, 234-38; Hartsough, *Canoe*, 74-75. Some easterners came to take the "fashionable tour." Arriving in St. Louis or at other railheads on the river's east bank, these excursionists traveled upstream, sometimes to St. Anthony Falls, imbibing the river's beauty; see the above references. Walter Havighurst, *Upper Mississippi, A Wilderness Saga* (New York: Farrar & Rinehart, New York: J. J. Little and Ives Company, 1944), p. 166; Hartsough, *Canoe*, pp. 106-7.

7 Tweet, "History of Transportation on the Upper Mississippi and Illinois Rivers," p. 22.

8 Frederick J. Dobney, *River Engineers of the Middle Mississippi: A History of the St. Louis District, U.S. Army Corps of Engineers* (Washington, D.C.: U.S. Government Printing Office, 1978), p. 33.

9 Donald B. Dodd and Wynelle S. Dodd, Historical Statistics of the United States, 1790-1970, Vol. II The Midwest (The University of Alabama Press, 1973), pp. 2, 10, 22, 46.

10 Petersen, "Captains," p. 235; Tweet, "History of Transportation on the Upper Mississippi and Illinois Rivers," pp. 21-22.

11 Todd Shallat, *Structures in the Stream: Water, Science, and the Rise of the U.S. Army Corps of Engineers* (Austin: University of Texas, 1994), p. 141.

12 Pike, *Sources of the Mississippi*, p. 24; Keating, *Narrative of an Expedition*, p. 297.

13 Havighurst, *A Wilderness Saga*, p. 249; Merrick, Old Times, p. 232.

14 U.S. Army Corps of Engineers, *Annual Report of the Chief of Engineers, 1872* (Washington, D.C.: Government Printing Office, 1876-1940), p. 309; Annual Report, 1881, p. 2746.

15 *Annual Report, 1877*, p. 528.

16 Merrick, *Old Times*, p. 15.

17 Ibid., pp. 18-19, 29-30.

18 Ibid., p. 35.

19 Ibid., pp. xii-xiii, 35, 80, 83, 240.

20 Ibid., pp. 93, 95.

21 Merrick, *Old Times*, p. 100. Havighurst, *A Wilderness Saga*, p. 158, says that early steamboating was "a triumph of men more than machines," and, p. 159, that "piloting was not so much a trade as a miracle."

22 Capt. "Nate" Nathan Daly, *Tracks and Trails: Incidents in the Life of a Minnesota Pioneer*, (Walker, Minnesota: Cass County Pioneer, 1931), p. 18; Havighurst, *A Wilderness Saga*, p. 161.

23 Shortly after the glaciers withdrew from southern Minnesota some 10,000 years ago, St. Anthony Falls stretched across the river valley near downtown St. Paul. A thick limestone mantle formed the riverbed. Just below this mantle lay a soft sandstone layer. As water and ice eroded the sandstone out from underneath the limestone at the edge of the falls, the limestone broke off in large slabs, and the falls receded.

24 Edward L. Pross, "A History of Rivers and Harbors Appropriation Bills, 1866-1933," Ph.D. dissertation, Ohio State University, 1938, p. 44.

25 U.S. Congress, House, Laws of the United States Relating to the Improvement of Rivers and Harbors, vol. 1, 62nd Cong., 3d sess., Doc. No. 1491 (Washington, D.C.: Government Printing Office, 1913), pp. 152-53.

26 Raymond Merritt, *Creativity, Conflict & Controversy: A History of the St. Paul District, U.S. Army Corps of Engineers* (Washington: U.S. Government Printing Office, 1979); Roald Tweet, *A History of Rock Island District* (Washington: U.S. Government Printing Office, 1984), pp. 62-66. Duties for the middle Mississippi stayed with the Office of Western Improvements in Cincinnati until 1873, when St. Louis became the new office for the middle river; see Dobney, *River Engineers*, pp. 44-45.

27 *Annual Report*, 1867, p. 262.

28 U.S. Congress, House, "Survey of Upper Mississippi River," 39th Congress, 2d sess., House Ex. Doc. No. 58, pp. 17-18.

29 Ibid., p. 18.

30 *Annual Report*, 1875, Part 2, Vol. 2, Appendix CC, "Reports on Transportation Routes to the Seaboard," p. 455.

31 U.S. Congress, House, "Survey of Upper Mississippi River. Letter from the Secretary of War in answer to a resolution of the House, of December 20, 1866, transmitting report of the Chief of Engineers, with General Warren's report of the surveys of the Upper Mississippi river and its tributaries," 39th Congress, 2d Session, Ex. Doc. No. 58, p. 5.

32 John O. Anfinson, "The Secret History of the Mississippi's Earliest Locks and Dams," *Minnesota History* 54:6 (Summer 1995): 254-67.

33 *Annual Report*, 1867, p. 260.

34 House Ex. Doc. No. 58, "Survey of Upper Mississippi River," p. 25.

35 Ibid., p. 27.

36 Frank Haigh Dixon, *A Traffic History of the Mississippi River System*, National Waterways Commission, Document No. 11 (Washington: Government Printing Office, 1909), pp. 29-30; Frederic L. Paxson, "Railroads of the Old Northwest before the Civil War," *Transactions of the Wisconsin Academy of Sciences, Arts and Letters* 17 (1914): 257-60, 269-71. William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W.W. Norton & Company, 1991), p. 296, says that the first railroad to reach the Mississippi River was the Chicago, Alton and St. Louis in 1852-53. However, Paxson, whom he cites, shows that the railroad completed tracks from Alton to Springfield, Illinois, in 1852, and then from Springfield to Chicago (via a roundabout route) in 1853, but did not have the line in operation until 1854. Gary F. Browne, "The Railroads, Terminals and Nexus Points in the Upper Mississippi Valley," in John S. Wozniak ed., *Historic Lifestyles in the Upper Mississippi River Valley* (New York: University Press of America, 1983), p. 84, says the first railroad reached the Mississippi River at Rock Island on February 22, 1854. Petersen, *Steamboating*, p. 298, also recognizes the railroad at Rock Island as the first to reach the river.

37 Frederic Paxson, *American Frontier, 1763-1893* (Chicago: The Riverside Press, 1924), p. 517.

38 Contrary to most histories that follow Dixon, *A Traffic History*, p. 48, in saying that there were thirteen bridges across the Mississippi River by 1880, Patrick Brunet, "The Corps of Engineers and Navigation Improvements on the Channel of Upper Mississippi River to 1939," Master's Thesis (Austin: University of Texas, 1977), p. 46, says that there were fourteen bridges across the river by 1877, and he lists them.

39 Lester Shippee, "Steamboating on the Upper Mississippi after the Civil War: A Mississippi Magnate," *Mississippi Valley Historical Review* 6:4 (March 1920): 496; Dixon, *A Traffic History*, p. 49; Hartsough, *Canoe*, pp. 84-85, 91.

40 Hartsough, *Canoe*, pp. 196-97, 199; Tweet, *History of Transportation*, 38-39.

41 Hartsough, *Canoe*, pp. 197, 203.

42 Solon J. Buck, *Granger Movement: A Study of Agricultural Organization and Its Political, Economic and Social Manifestations, 1870-1880*, (Cambridge: Harvard University Press, 1933), pp. 40-42; William D. Barns, "Oliver Hudson Kelley and the Genesis of the Grange: A Reappraisal," *Agricultural History* 41 (July 1967): 229-30. Throughout his article (pp. 229-42), Barns addresses three issues concerning Kelley. First, did Kelley get the idea for the Grange on his trip through the South? Second, was the idea of the Grange really his? And, did Kelley want to make the Grange into the radical organization it became during the early 1870s, or did events force the Grange that way? Barns credits Kelley with founding the Grange, recognizing the role of others, particularly of Miss Carrie Hall, Kelley's niece. Barns also argues that Kelley came away from his southern trip with the idea for the Grange, and that Kelley had a more radical organization in mind from the outset than Buck and other historians admit. Thomas A. Woods, *Knights of the Plow: Oliver Kelley and the Origins of the Grange in Republican Ideology* (Ames: Iowa State University Press, 1991), (Chapters 7 and 8) supports and greatly expands on Barns' argument that Kelley actively pushed economic and political solutions and/or tacitly approved while others did so.

43 Buck, *Granger Movement*, p. 108.

44 Ibid., pp. 108-9.

45 Woods, *Knights*, pp. 138-39.

46 Harold B. Schonberger, *Transportation to the Seaboard: The Communication Revolution and American Foreign Policy, 1860-1900* (Westport, Connecticut: Greenwood Publishing Corporation, 1971), p. 21.

47 Ibid., p. 22.

48 *St. Louis Democrat*, May 14 and 15, 1873.

49 Woods, *Knights*, p. 141.

50 Blegen, *Minnesota: A History of the State* (Minneapolis: University of Minnesota Press, 1975, 1963), p. 290.

51 Ibid., p. 293. While still in his twenties, Donnelly had become Minnesota's lieutenant governor. He moved on to represent Minnesota in the U.S. House for 6 years as a Republican. But in 1868, he quarreled with Minnesota's senior Republican leader, Alexander Ramsey, and failed to get reelected.

52 Woods, *Knights*, pp. 148, 151-52, 155; Schonberger, *Transportation to the Seaboard*, pp. ix-xix, 3-30; Robert S. Salisbury, *William Windom, Apostle of Positive Government* (New York: University Press of America, 1993), pp. 123-24.

53 Salisbury, *William Windom*, p. 113.

54 The Senate also considered a warning from Republican President Ulysses Grant. Well aware of the agrarian unrest, he had warned the Senate that, "this

river would inevitably be forced on the Gov. branch . . . and suggested that the Congress study the problem and find a solution." Windom, *Select Committee*, p. 7; Schonberger, *Transportation to the Seaboard*, p. 73.

55 Windom, *Select Committee*, p. [illegible].

56 Ibid., p. [illegible].

57 Ibid., p. [illegible]. The Select Committee recommended a depth of 5 feet at low water for St. Paul to St. Louis, p. [illegible].

58 Ibid., p. [illegible].

59 In 1872 Captain J. [illegible] argued that while wing dams would probably not work for the upper river, closing dams would. *Annual Report 1872*, pp. [illegible].

60 *Annual Report 1875*, p. [illegible]. The Corps may have done some work with closing dams earlier. In his report for the 1871 season Captain Wm. [illegible] reported that the Corps's work had included 1,400 feet of wing dams. He does not provide a location for this work and there is no mention of it in later reports, however. *Annual Report 1872*, p. [illegible].

61 Before 1906, the important problem of the arrangements was largely left to the judgment of local engineers. As stated in U.S. Congress, House, *Letter from the Secretary of War Transmitting, with a Letter from the Chief of Engineers, Report of Examination for Six Foot Channel in the Mississippi River between the Missouri River and St. Paul, Minn.*, 59th Cong., 2nd sess., H. Doc. No. [illegible], pp. [illegible]:

> *The rule has been to place them, in straight reaches, the extremities of the proposed channel width apart; in curved reaches, one half on the concave side and the full width on the convex side. Assistant Engineer W. A. Thompson gives a rule which is better adapted to the present project (the 6-foot channel), in which he places the dams in straight reaches the full channel width apart, increasing the space 25 per cent on the convex side and diminishing it 25 per cent on the concave side, depending on the degree of curvature. Wings should be pointed upstream at the following angles: 100° to 110° in straight reaches, 100° to 105° in concave, 105° to 110° in convex, and they should be so located where practicable that their axes prolonged would meet in the center of the channel.*

62 For wing dams, the suggested proportions of brush to rock was two to one, although when the current was strong, the ratio might increase to a ratio of three or four portions of brush for every one of rock. H. Doc. No. [illegible], p. [illegible]; *Annual Report 1879*, p. [illegible]; see figures 1, 2, and 3 and Plate 1.

63 [illegible] Hill, "Out With the Flow," *Minnesota History* ([illegible]): [illegible].

64 Hill, "Out With the Flow," p. [illegible].

65 *Annual Report 1880*, p. [illegible].

66 *Annual Report 1895*, pp. [illegible]; *Annual Report 1899*, p. [illegible]; *Annual Report 1902*, p. [illegible]; Raymond H. Merritt, *The Corps, the Environment, and the Upper Mississippi River Basin* (Washington, D.C.: Government Printing Office, 1984), p. 3; Merritt, *Creativity*, pp. [illegible]; [illegible] Carroll, "Dams and Damages: The Ojibway, the United States, and the Mississippi Headwaters Reservoirs," *Minnesota History* (Spring 1990): [illegible].

67 Lucile M. Kane, "Rivalry for a River: the St. Paul [illegible] and the Mississippi," *Minnesota History* [illegible] (December 1961): [illegible].

68 Ibid., pp. [illegible].

69 Ibid., p. [illegible].

70 Merritt, *Creativity*, p. [illegible]; Lucile M. Kane, *The Falls of St. Anthony: The Waterfall that Built Minneapolis* (St. Paul: Minnesota Historical Society Press, 1987), pp. [illegible]; Kane, "Rivalry," pp. [illegible]. Kane adds that during these years [illegible] had sought to get the required completion date extended. This also caused some delay.

71 U.S. Congress, House, *Survey of the Upper Mississippi River*, Exec. Doc. 58, 39th Cong., 2d sess., p. [illegible]; Kane, *St. Anthony*, pp. [illegible]; Kane, "Rivalry," p. [illegible].

72 H. Exec. Doc. 58, pp. [illegible].

73 Kane, *St. Anthony*, p. [illegible].

74 House Ex. Doc. 58, p. [illegible].

75 Ibid., p. [illegible].

76 Anderson, "Secret History," *Minnesota History* [illegible] (Summer [illegible]): [illegible].

77 *Annual Report 1866*, pp. [illegible]; *Laws of the United States*, pp. [illegible]; H. Exec. Doc. 58, pp. [illegible]. In his next report to the Chief of Engineers Warren noted that new surveys showed that the Corps would have to build a second lock and dam [illegible] near the mouth of Minnehaha Creek, about one half mile below Lock and Dam No. 1; see U.S. Congress, House, *Survey of the Upper Mississippi River*, Exec. Doc. [illegible], 40th Cong., 2d sess., p. 9.

78 Kane, "Rivalry," pp. [illegible], quote from p. [illegible]; Kane, *St. Anthony*, p. [illegible].

79 Kane, "Rivalry," p. [illegible].

80 Ibid. The St. Paul businessmen included William L. McNair, Eugene M. Wilson, William S. King, Edward Murphy, and Isaac Atwater. [illegible] Kane says retained some shares of the company for himself, as did his friends.

81 Ibid., pp. [illegible]. Opponents to the amendments included entrepreneur engineer William D. Washburn and Richard Chute. Allied with them were sawmill operators and boom company operators William W. Eastman, John Martin, Sumner W. Farnham, James A. Lovejoy, and Joel B. Bassett. Support for the project came from the company's stockholders, navigation boosters, and city business leaders. Kane, *St. Anthony*, p. [illegible], points out that the state never transferred the grant to the company.

82 Kane, "Rivalry," pp. [illegible]; Kane, *St. Anthony*, p. [illegible]. In 1869 a tunnel from the foot of the falls to Nicollet Island collapsed just below the island. Due to the collapse of this tunnel, St. Anthony Falls was in danger of [illegible]. The Corps of Engineers was working on a project to save the falls.

83 Kane, "Rivalry," p. [illegible], suggests that the federal government recognized its obligation for improving navigation in 1873 by authorizing $75,000 for the project. Merritt, *Creativity*, p. [illegible], says that "When it appeared that the Mississippi River Improvement and Manufacturing Company would not be able to resolve its internal conflicts, Congress decided to give the project over to the Corps of Engineers." Neither author discusses who persuaded Congress to authorize the project.

84 *Annual Report 1873*, p. [illegible]; *Annual Report 1874*, p. [illegible].

85 Merritt, *Creativity*, p. [illegible].

86 *Annual Report 1891*, p. [illegible]. Mackenzie, *Annual Report 1890*, p. [illegible], reported that the Corps had completed several examinations of the area over the last year, in company with the Minneapolis representatives of the river interests.

87 *Annual Report 1890*, p. [illegible]; *Annual Report 1892*, pp. [illegible]. In June and July of 1891, Mackenzie carried out extensive "accurate surveys" of most of the river from the Minneapolis steamboat warehouse to the Short Line bridge below Meeker Island and of other areas down to the Minnesota River. See *Annual Report 1891*, p. [illegible].

88 *Annual Report 1894*, pp. [illegible]; U.S. Congress, Senate, "Construction of Locks and Dams on the Mississippi River," [illegible] Cong., 2d sess., Exec. Doc. No. [illegible], pp. 7-8.

89 U.S. Congress, House, *Laws of the United States Relating to the Improvement of Rivers and Harbors*, vol. 2, 62nd Cong., 3d sess., Doc. No. 1491 (Washington, DC: Government Printing Office, 1913), p. [illegible]; Kane, *St. Anthony*, p. [illegible], says "Deprived of the navigation facilities that existed pre-

quarter. Minneapolitans continued to urge the federal government to act. United States army engineers responded in 1894 by announcing plans for two locks and dams . . ." This misplaces the authority for authorizing the project with the Corps instead of Congress and makes the Corps a proactive proponent of the project, which she does not demonstrate they were. Granted, Mackenzie repeatedly called for locks and dams. Kane jumps to the construction of Lock and Dam 2, without discussing who made the final push for the project.

90 *Annual Report, 1908*, pp. 530, 1619-50; *Annual Report, 1907*, pp. 1578-79.

91 Major Francis R. Shunk to Minneapolis Mayor J. C. Haynes, February 17, 1909, St. Paul District records, St. Paul, Minnesota.

Chapter 5

1 Grain traffic through the Des Moines Rapids Canal and at St. Louis during the late nineteenth century illustrates the decline of the freight trade on the upper river. In 1879 and 1880 over two million bushels of grain passed through the canal, but it only registered 400,000 bushels at the end of the decade and less than 56,000 bushels after 1895. See Frank H. Dixon, *A Traffic History of the Mississippi River System*, National Waterways Commission, Document No. 11 (Washington, D.C.: Government Printing Office, 1909), p. 51.

2 *Annual Reports, 1892-1909.*

3 Philip V. Scarpino, *Great River: An Environmental History of the Upper Mississippi, 1890-1950* (Columbia: University of Missouri Press, 1985), p. 17, says that towns along the river formed the Upper Mississippi River Improvement Association due to the loss of timber-related businesses. They hoped that by reviving the river they could restore their sinking economies.

4 Upper Mississippi River Improvement Association, *Proceedings of the Upper Mississippi River Improvement Association Convention Held at Quincy, Illinois, November 12-13, 1902* (Quincy, Illinois, n.d.), pp. 6, 8-9.

5 Ibid., p. 71.

6 Gilbert C. Fite, "The Farmer's Dilemma, 1919-1929," in John Braeman, Robert H. Bremner, and David Brody, ed., *Change and Continuity in Twentieth Century America: The 1920's* (Columbus: Ohio State University Press, 1968), p. 67; James H. Shideler, *Farm Crisis, 1919-23* (Los Angeles: University of California Press, 1957), p. 4.

7 Upper Mississippi River Improvement Association, Proceedings of the Upper Mississippi River Improvement Association held in Minneapolis, Minn., October 10 and 11, 1906 (Quincy, Illinois: McMein Printing Company), p. 69.

8 Ibid., pp. 66-68.

9 Samuel Hays, *Conservation and the Gospel of Efficiency: the Progressive Conservation Movement, 1890-1920* (Cambridge, Mass.: Harvard University Press, 1959); Rebecca Conard, "The Conservation Movement in Iowa, 1857-1942," National Register of Historic Places Multiple Property Documentation Form, Iowa State Historic Preservation Office (1991), E 2-6; W. J. McGee, "The Conservation of Natural Resources," *Proceedings of the Mississippi Valley Historical Association for the Year 1909-1910*, 3 (Cedar Rapids, Iowa, 1911), pp. 361-79; Gifford Pinchot, *The Fight for Conservation* (Seattle: University of Washington Press, 1967; New York: Doubleday, Page & Company, 1910); Carolyn Merchant, ed., *Major Problems in Environmental History* (Lexington, Massachusetts, 1993), chaps. 9-11; Kendrick A. Clements, "Herbert Hoover and Conservation," *American Historical Review* 89 (February 1984): 85-86.

10 Pross, "Appropriation Bills," p. 139. On railroads having reduced their rates as far as possible see E. V. Smalley, "The Deep Waterways Problem," *Forum* XIX (Aug. 1895): 746-57.

11 Hays, *Conservation*, p. 91.

12 Ibid., pp. 91-92.

13 Ibid., p. 92.

14 McGee, "Our Great River," p. 8576.

15 Hays, *Conservation*, pp. 92-94.

16 UMRIA *Proceedings, 1902*, p. 16.

17 Ibid., pp. 16, 80.

18 Ibid., p. 79.

19 Ibid., p. 77, letter read to the convention from Captain J. F. Ellison, secretary of the National Rivers and Harbors Congress.

20 Pross, "Appropriation Bills," pp. 131-32.

21 McGee, "Our Great River," *World's Work* (February 13, 1907), p. 8577.

22 Robert H. Wiebe, *The Search for Order, 1877-1920* (New York: Hill and Wang, 1967); John Milton Cooper, Jr., *Pivotal Decades: The United States, 1900-1920* (New York: W. W. Norton & Company, 1990).

23 Hays, *Conservation*, p. 2.

24 Hays, *Conservation*, p. 114.

25 Jerome G. Kerwin, *Federal Water-Power Legislation* (New York: Columbia University Press, 1926), pp. 8-11, 82-83, 111-25.

26 War Department, Office of the Chief of Engineers, Circular No. 14, April 6, 1905, National Archives and Records Administration, Record Group 77, Entry 103, Box 1408, F 50162, pp. 2-3; *Congressional Record*, 1903, Vol. 36, pt. 3, p. 3072; Kerwin, *Water Power*, p. 79.

27 War Department, Circular No. 14, p. 3; Kerwin, *Water Power*, pp. 82-84.

28 *Congressional Record*, 1903, pp. 3071-72. A Representative from Alabama argued that the charges were reasonable, while Representative Theodore Burton of Ohio argued that they were minimal. Burton defended the President's veto, arguing that it gave an extremely valuable resource to a small group of individuals for their exclusive use. Without a set policy, he cautioned, Congress would appear to engage in favoritism to those who received grants. See p. 3072.

29 In 1904, at Hales Bar on the Tennessee River, Congress required the Corps to build the lock but made the Chattanooga Tennessee River Power Company pay for the dam. The company received the power at no charge and won a 99-year lease. In 1905, the Keokuk and Hamilton Water Power Company obtained a grant to build a power dam on the upper Mississippi River at Keokuk, Iowa. Here, the Corps determined that the Des Moines Rapids canal served navigation needs and the company had to build the dam and lock at its own expense. Leland Johnson, *Engineers on the Twin Rivers: A History of the Nashville District Corps of Engineers, United States Army* (Nashville, Tennessee: U.S. Army Engineer District, Nashville, 1978), pp. 163-64; Scarpino, *Great River*, pp. 23-24. W. L. Marshall, the Chief of Engineers, may have recommended that the Corps build all of Lock and Dam No. 1 to avoid problems that arose over agreements at sites like these.

30 Kerwin, *Water Power*, pp. 111-14. Kerwin, p. 117, says that Roosevelt, in his 1908 veto of a project on the Rainy River in Minnesota, admitted that "There is a sharp conflict of judgment as to whether this general act empowers the War Department to fix a charge and set a time limit. All grounds for such doubts," he contended, "should be removed henceforth by the insertion in every act granting such a permit of words adequate to show that a time limit and a charge to be paid to the Government are among the interests of the United States which should be protected through conditions and stipulations to be approved either by the War Department, or, as I think would be

preferable to the Interior Department." Hays, *Conservation*, pp. 117-19.

31 Scarpino, *Great River*, p. 67; Hays, *Conservation*, p. 90-91, 100.

32 Hays, *Conservation*, pp. 90, 102-03.

33 Merritt, "The Great River," pp. 85-86.

34 Ibid., p. 85-79.

35 Scarpino, *Great River*, p. 22.

36 Kane, *St. Anthony Falls*, pp. 133, 151, 154. Why the Twin Cities changed their positions on the project deserves much more research.

36 U.S. Congress, House, *Use of Surplus Water Flowing over Government Dam in Mississippi River between St. Paul and Minneapolis, Minn.*, 60th Cong., 1st sess., Doc. No. 216, pp. 2-6. Mackenzie, after serving as the Rock Island District Engineer from 1879 to 1895, became the Chief of Engineers on January 23, 1908. The commissioners were Major W. V. Judson from the Corps of Engineers, J. J. Woodwell from the Treasury Department, and Major James B. Kimball from the Quartermaster Corps.

37 Ibid., p. 1. While the head at this site varied from 10.2 feet at low water to 13.0 feet at high stages, the high stages lasted longer than usual, due to the Minnesota River, which entered the Mississippi about one mile downstream and backed water up to Lock and Dam No. 1.

38 Ibid., pp. 2-3, 5-6.

39 Merritt, *Creativity*, p. 142. Merritt argues that Minneapolis and St. Paul officials haggled over the placement of Lock and Dam No. 1 and that high water hampered its start. "Business interests in Minneapolis and St. Paul," he contends, "used the delay to press for a larger dam that would generate electrical power." He does not say who these interests were.

40 *Laws of the United States*, v. 2, 1383; *Annual Report*, 1909, p. 561.

41 U.S. Congress, House, *Mississippi River, St. Paul to Minneapolis, Minn.*, 61st Cong., 2d sess., H. Doc. 741, p. 5. The board proposed using flash boards, wooden boards attached to the dam's surface, to raise the height of Dam No. 2 to provide for a 6-foot channel. At Lock and Dam No. 1, they proposed raising the height of the dam by one foot and adding an auxiliary lock below Lock and Dam No. 1 for extreme low water situations. The Board of Engineers for Rivers and Harbors concurred with the first recommendation but disagreed with the second. Rather than building another lock, it suggested that the Corps lower the already completed floor to the necessary depth. See pp. 5, 11.

42 Ibid., pp. 5-6. Placing the dam farther upstream would have required a lower dam because of the new Pillsbury-Washburn hydroelectric station and dam at Lower St. Anthony Falls. They decided against building it farther downstream because it would have flooded the Minnehaha Creek gorge, which the board noted was "one of the natural attractions of the city of Minneapolis."

43 Ibid., p. 6.

44 Major Francis R. Shunk to Minneapolis Mayor J. C. Haynes, February 17, 1909, St. Paul District records, St. Paul, Minnesota.

45 Ibid.

46 *Minneapolis Tribune*, June 9, 1909, p. 1; H. Doc. 741, p. 5. Representatives from the University of Minnesota had met a party from St. Paul and Minneapolis at Lock and Dam No. 1 the day before. At this encounter, the two cities learned of the University's interest in the hydroelectric power of the high dam.

47 *Minneapolis Tribune*, June 9, 1909, p. 1.

48 St. Paul *Pioneer Press*, June 10, 1909, p. 1.

49 *Minneapolis Tribune*, June 10, 1909, p. 2; St. Paul *Pioneer Press*, June 10, 1909, p. 1; H. Doc. 741, p. 5.

50 H. Doc. 741, p. 6; St. Paul *Pioneer Press*, June 10, 1909, p. 1; Kane, "Rivalry," p. 171.

51 H. Doc. 741, p. 6.

52 Ibid., pp. 8-9.

53 Ibid., p. 7.

54 Ibid., p. 8. In contrast to this position by the board, the *Minneapolis Tribune*, June 10, 1909, p. 1, reported that those present at the June 9 public meeting voted to go on record as favoring the building of the high dam, whether accomplished by the state, the cities or a private interest.

55 H. Doc. 741, pp. 8-9, 12-13. The board eliminated the State of Minnesota from consideration because it believed that the state's constitution was not likely to be amended to allow it to engage in such a project. The Minneapolis resolution included hydropower for the University of Minnesota.

56 Ibid., p. 3.

57 Ibid., pp. 3-4. Hays, *Conservation*, p. 114, presents information that would explain Marshall's decision. Hays relates that when some members of the Inland Waterways Commission suggested that private parties pay the cost of the hydropower portion of a navigation dam, "the Corps of Engineers and many in Congress objected that this would give rise to conflicts in operation and administration . . . ." As a result, Hays says, the commission decided that the federal government would pay the construction costs and lease the power. The question at Lock and Dam No. 1 was not simply whether the government would pay all or part of the cost to make hydroelectric power possible. The fact that the Engineers had completed much of the authorized navigation project put the Corps in the position of redoing the project specifically to accommodate hydropower development. See Hays, pp. 109 and 215, for General Mackenzie's position on this issue.

58 H. Doc. 741, p. 3.

59 Merritt, *Creativity*, p. 144. Merritt, p. 145, adds that while Shunk recognized that the Corps had no authority to develop hydropower, he believed that this "was just a case of legislative oversight . . . ." Given the debate over the government's role in hydroelectric power development, it was not simply a matter of legislative oversight but of national disagreement over federal hydropower development.

60 Shunk to Haynes, February 17, 1909.

61 Merritt, *Creativity*, pp. 144-45.

62 River and Harbor Act, June 25, 1910, *Laws of the United States*, v. 2, pp. 1419-20; *Annual Report*, 1910, pp. 1799-1800.

63 River and Harbor Act, July 25, 1912, *Laws of the United States*, v. 2, pp. 1561-65.

64 Hays, *Conservation*, pp. 102-10.

65 Ibid., pp. 108-12.

66 Ibid., pp. 109-11. In 1917 Congress approved Newlands' bill, but many changes called for in the bill had already been made, undermining its significance. See also Donald C. Swain, *Federal Conservation Policy, 1921-1933* (Berkeley and Los Angeles: University of California Press, 1963), p. 98.

67 As noted earlier, Congress, in the River and Harbor Act of 1910, *Laws of the United States*, v. 2, pp. 1419-20, provided for "reasonable compensation from a hydroelectric power lease at Lock and Dam No. 1." *Annual Report*, 1910, pp. 1799-1800.

68 Hays, *Conservation*, p. 119.

69 Scarpino, *Great River*, p. 65.

70 Hays, *Conservation*, pp. 115-21. Hays says that the 1920 act represented a compromise between conservationists and their opponents. While it promoted hydroelectric power development, it separated water power from other water related developments. This essentially ended hopes for the multiple purpose approach for over a decade. Swain, *Federal Conservation Policy*, pp. 111-21, notes that the act also created a Federal Power Commission (FPC) and formalized federal regulation of hydroelectric power development. The act gave the FPC jurisdiction over all water power sites on navigable streams, the authority to grant 50-year licenses and to regulate electrical rates and services. "Most important," Swain, p. 113, argues, "the commission received authority to require that projects be planned in accordance with a comprehensive scheme of improvement and utilization for the purposes of navigation, of water power development, and of other beneficial uses. . . ." Swain criticizes the commission, however, for being ineffective.

71 Merritt, *Creativity*, p. 116. Hydroelectric power development at Lock and Dam No. 1 became the Federal Power Commission's Project No. 362.

72 George W. Irvin and William H. Tempertey, "Study of Proposed Water Power Development at U.S. Lock and Dam No. 1, Mississippi River Between St. Paul and Minneapolis," Thesis, University of Minnesota, 1910, p. 1; Jon Gjerde, "Historical Resources Evaluation, St. Paul District Locks and Dams on the Mississippi River and Two Structures at St. Anthony Falls, unpublished for St. Paul District, Corps of Engineers," September 1983, p. 84.

73 Walter C. Beckjord, Ralph M. Davies, Lester H. Gatzke, "A Study of Proposed Water Power Development at U.S. Lock and Dam No. 1, Mississippi River between St. Paul and Minneapolis," Thesis, University of Minnesota, 1909, pp. 1-2. This thesis and the previous one by Irvin and Tempertey were written as the University of Minnesota was considering how it might use the hydroelectric power generated at a high dam.

74 Kane, "Rivalry," p. 332.

75 Shunk to Harvey, February 17, 1909, U.S. Congress, House, "Survey of the Upper Mississippi River," Exec. Doc. 237, 60th Cong., 2d sess., p. 9.

76 Twin Cities businessmen had taken a greater interest in freight rates as rail roads had begun to raise their rates. "Under the spur of increasing railroad freight rates, there has developed amongst the business men of the Twin Cities in the past few months a real interest in the revival of river traffic." This may refer to the fact that the decision in the Indiana Rate Case was to take effect in 1925. U.S. Congress, House, *Mississippi River from Minneapolis to Lake Pepin, Report from the Chief of Engineers on Preliminary Examination and Survey of Mississippi River from Minneapolis to Lake Pepin, with a View to Improvement by the Construction of Locks and Dams*, 69th Cong., 2d sess., Doc. No. 583, p. 19.

77 Ibid., p. 19.

78 Ibid., p. 17.

79 Ibid., pp. 11-15.

80 Ibid., p. 14.

81 Ibid.

82 Ibid., pp. 11-15.

83 Ibid., pp. 21-30.

84 Merritt, *Creativity*, p. 195; Richard Hoops, *A River of Grain: the Evolution of Commercial Navigation on the Upper Mississippi River* (Madison: University of Wisconsin-Madison, College of Agricultural and Life Sciences Research Report, R3584, n.d.), pp. 56-57.

85 Herbert Quick, *American Inland Waterways: Their Relation to Railway Transportation and to the National Welfare; Their Creation, Restoration and Maintenance* (New York, 1909), p. 77. The 1920s farm crisis made farm organizations and farm equipment manufacturers some of the strongest supporters of navigation improvements during this decade.

86 Roald Tweet, *History of Transportation*, p. 77; Herbert Hoover, "The Improvement of Our Mid-West Waterways," *The Annals of the American Academy* 135 (January 1928): pp. 15-24; Idem, "Address at Louisville, Kentucky, October 23, 1929, in celebration of the Completion of the Nine-foot Channel of the Ohio River . . .," William Starr Myers, ed., *The State Papers and Other Public Writings of Herbert Hoover*, vol. 1 (Garden City, N.Y.: Doubleday, Doran & Company, Inc., 1934), pp. 116-22; Franklin Snow, "Waterways as Highways," *North American Review* 227 (May 1929): 593.

87 Public Service Commission of Indiana Et Al. v. Atchison, Topeka & Santa Fe Railway Company, *Interstate Commerce Commission Reports, Decisions of the Interstate Commerce Commission of the United States*, v. 66, no. 11388, (January to March 1922): 520, 512-22; Ibid., v. 88, no. 11388, (February to April 1924): 709-24; Ibid., v. 88, no. 13671, 738-43.

88 Ibid., v. 66, no. 11388, p. 523.

89 *St. Paul Pioneer Press*, "An Inland Empire's Need," May 12, 1928.

90 Hoops, "A River of Grain," argues that a small clique of men pushed the 9-foot channel project through and that it was a pork barrel project. One must consider his argument carefully, but he underestimates the power, depth and expanse of the movement. Given the great interest and popular support for this project, it transcended simple pork barrel projects.

91 Kane, *St. Anthony*, pp. 151, 171-76; Clarence Bardsley, "A Review of the Construction of the St. Anthony Falls Project," St. Paul District Records (1963); Francis Mullin, "The St. Anthony Falls Navigation Project," *Proceedings of the American Society of Civil Engineers* 89 (CO1) (March 1963): 1-18; Marvin Nelson, "Nine-foot Channel Extension Above St. Anthony Falls," *The Minnesota Engineer* (June 1960): 6-9; "Flooding and Unusually Tough Test Contractors' Mettle on River Job," *Construction Bulletin* (March 6, 1952): 16-11.

92 Letter from H. M. Byllesby & Company, Insurance Exchange Building, Chicago, Illinois, from William de la Barre, written at the Minneapolis General Electric Office; Hennepin Parks, Coon Rapids Dam, historic files.

93 "Railroads, Power Dam Figure in Coon Rapids Early History," Anoka County Union Centennial, September, 1965; Hennepin Parks, Coon Rapids Dam, historic files, *Anoka County Union Herald*, September, 1965.

94 Hennepin Parks, Coon Rapids Dam, historic files, *Anoka County Union Herald*, November 26, 1913. The article had originally been printed in the *Minneapolis Tribune*. See U.S. Congress, House, "An Act To authorize the Great Northern Development Company to construct a dam across the Mississippi River from a point in Hennepin County to a point in Anoka County, Minnesota," 61st Cong., 3rd sess., Chapter 12, p. 891. The act specifically stated that the company had to build the dam and power plant in accordance with the Water Power acts of June 21, 1906, and June 23, 1910.

95 Hennepin Parks, Coon Rapids Dam, historic files, *Anoka County Union Herald*, November 26, 1913.

96 Hennepin Parks, Coon Rapids Dam, historic files, *Anoka County Union Herald*, December 17, 1913.

97 "Railroads, Power Dam Figure in Coon Rapids Early History," *Anoka County Union Centennial*, September, 1965; Hennepin Parks, Coon Rapids Dam, historic files, *Anoka County Union Herald*.

98 Ibid.

Chapter 6

1 Scott F. Anfinson, "Archaeology of the Central Minneapolis Riverfront, Part 1: Historical Overview and Archaeological Potentials," *The Minnesota Archaeologist* 48 (1-2) (1989): 17-30.

2 Ibid., p. 19.

3 Anfinson, "Archaeology," p. 19; Kane, *St. Anthony*, p. 5; Dave Wiggins (St. Anthony Falls Heritage Zone), personal communication, April 27, 2000.

4 Hennepin, *Description of Louisiana*, p. 117.

5 Stephen H. Long, *Voyage in a Six-Oared Skiff to the Falls of Saint Anthony in 1817 by Major Stephen H. Long, Topographical Engineer, United States Army.* Collections of the Minnesota Historical Society, vol. II. St. Paul, Minnesota: Minnesota Historical Society, 1889 (facsimile copy printed 1991), pp. 27-40; Kane, *St. Anthony*, pp. 2-3. In footnote 5, p. 197, she says there are many versions of this story and lists some.

6 Henry Rowe Schoolcraft, *Travels through the Northwestern Regions of the United States.* Ann Arbor, Michigan: University Microfilms, Inc., p. 291, from Henry Rowe Schoolcraft, *Narrative Journal of Travels through the Northwestern Regions of the United States Extending from Detroit through the Great Chain of American Lakes, to the Sources of the Mississippi River, Performed as a Member of the Expedition under Governor Cass, in the Year 1820.* Albany, New York: E. & E. Hosford, 1821.

7 Anfinson, "Archaeology," pp. 19-20; see Figure 5, p. 21.

8 Kane, *St. Anthony*, p. 3.

9 Long, *Voyage*, pp. 15-16. Long acknowledged that he did not have an instrument to measure the fall exactly.

10 Kane, *St. Anthony*, p. 2.

11 Pike, *Sources of the Mississippi*, pp. 92-93.

12 Kane, *St. Anthony*, p. 9.

13 Ibid., quotes pp. 2, 3, and 4 respectively.

14 Carole Zellie, "The Voice of Nature: Geographic Features and Landscape Change at St. Anthony Falls." A report prepared for the Saint Anthony Falls Heritage Board by Landscape Research, St. Paul, Minnesota, October 1989, p. 8. Dave Wiggins (St. Anthony Falls Heritage Zone) suggests that the trees on Spirit Island were cedar rather than oak. Personal communication, April 27, 2000.

15 Schoolcraft, *Travels*, p. 289; Zellie, "Voice of Nature," p. 9.

16 Schoolcraft, *Travels*, p. 290.

17 Zellie, "Voice of Nature," pp. 8-9.

18 "The Journal of James E. Colhoun, 1823," published in *The Northern Expeditions of Stephen H. Long: The Journals of 1817 and 1823 and Related Documents*, ed. by Lucile M. Kane, June D. Holmquist, and Carolyn Gilman. St. Paul: Minnesota Historical Society Press, 1978, p. 284.

19 G. C. Beltrami, *A Pilgrimage in America, Leading to the Discovery of the Sources of the Mississippi and Bloody Rivers; with a Description of the Whole Course of the Former, and of the Ohio.* Chicago: Quadrangle Books, Inc., 1962 (first edition published in London, England, 1828), pp. 204-05.

20 Beltrami, *Pilgrimage*, p. 205.

21 Kane, *St. Anthony*, p. 3.

22 Ibid., p. 4.

23 Zellie, "Voice of Nature," p. 10.

24 George W. Featherstonhaugh, *A Canoe Voyage up the Minnay Sotor; with an Account of the Lead and Copper Deposits in Wisconsin; of the Gold Region in the Cherokee Country; and Sketches of Popular Manners.* St. Paul: Minnesota Historical Society, 1970 (first published by Richard Bentley in London, England, 1847), pp. 253-54.

25 Featherstonhaugh, *Canoe Voyage*, p. 254.

26 Long, *Voyage*, p. 14.

27 Ibid., p. 15.

28 Zellie, "Voice of Nature," p. 11.

29 Kane, *St. Anthony*, pp. 9-12.

30 Ibid., p. 11.

31 Ibid., pp. 13-14.

32 Ibid., pp. 15-16.

33 Ibid., pp. 16-17; quote p. 17.

34 Ibid., p. 18.

35 Ibid.

36 Ibid.

37 Ibid., pp. 26-27.

38 Ibid., pp. 31-32.

39 Ibid., p. 32.

40 Anfinson, *[illegible]*, pp. 184-89.

41 Kane, *St. Anthony*, pp. 34-38.

42 Ibid., pp. 37, 42, 50-51.

43 Ibid., pp. 42, 44, 49. Sanford was the son-in-law of fur trade magnate Pierre Chouteau, Gebhard was a banker and importer, and Davis was a merchant. See p. 25.

44 Ibid., pp. 43-44.

45 Ibid., pp. 44-49, 52-54.

46 Ibid., pp. 49-54, 57. The company lengthened the canal to 600 feet in the mid-1860s and to 950 feet in the mid-1890s. It created a head of about 35 feet, and "... this waterpower distribution system turned a six block river front strip into the country's most densely industrialized, direct drive water power district." See National Register Continuation Sheet, p. 8.4.

47 Kane, *St. Anthony*, p. 53. Wiggins (personal communication, April 27, 2000) suggests that the date construction began on the east side tunnel was 1867, not 1866. The cave did serve some purpose. From 1875 to 1883, [illegible] & Pettengill used part of the tunnel and cave to bring tourists in on flatboats. See Kane, *St. Anthony*, p. 86.

48 Kane, *St. Anthony*, pp. 57, 58, 106.

49 Ibid., p. 71.

50 Ibid., p. 72.

51 *Minneapolis Tribune*, November 30, 1876.

52 Kane, *St. Anthony*, p. 81.

53 Ibid., pp. 106, 107. Scott Anfinson (personal communication, April 2000) provided the information regarding the cave dam.

54 Anfinson, "Archaeology," pp. 26-28; Kane, *St. Anthony*, pp. 107-08, 123.

55 Kane, *St. Anthony*, pp. 108, 115, 125.

56 Ibid., pp. 27, 33.

57 Dodd and Dodd, *Historical Statistics*, pp. 24-25; Solon J. Buck, *Granger Movement*, pp. 28-34. Kane, *St. Anthony*, p. 100, uses the following figures: Minnesota wheat harvest was 17.7 million bushels in 1869 and 19.1 million in 1880.

58 Anfinson, "Archaeology," p. 24; Kane, *St. Anthony*, pp. 59, 99, 101.

59 Kane, *St. Anthony*, pp. 104-05.

60 Dodd and Dodd, *Historical Statistics*, pp. 24-25.

61 Kane, *St. Anthony*, p. 102.

62 Ibid., pp. 101-03.

63 Ibid., p. 104.

64 Ibid., p. 103; see Cronon, *Nature's Metropolis*, chapter 3 for a detailed discussion of Chicago's grain marketing system.

65 Kane, *St. Anthony*, p. 105.

66 Ibid., p. 99.

67 Ibid., pp. 98-99, 113.

68 St. Anthony Falls Historic District (SAF), National Register of Historic Places, National Register Nomination Continuation Form, p. 8-8; Kane, *St. Anthony*, pp. 86, 101, 121.

69 Kane, *St. Anthony*, pp. 86, 87, 116, 123, 187.

70 Ibid., pp. 98-99; SAF, National Register Nomination Continuation Form, pp. 8-6 to 8-7.

71 Kane, *St. Anthony*, pp. 115, 150-51, 172-73; SAF, National Register Nomination Continuation Form, p. 8-7.

72 Kane, *St. Anthony*, pp. 136-37.

73 Ibid., pp. 140-41.

74 Scarpino, *Great River*, p. 22.

75 Kane, *St. Anthony*, p. 154.

76 Ibid., pp. 117, 149, 152-57, 165, 171-72; quote p. 154. The Corps of Engineers removed the lower dam when it built the Lower St. Anthony Lock and Dam in the early 1950s, and the station collapsed in 1987 after the river undermined its foundation. The outline of the old dam was clearly visible after the pool behind the lock and dam drained due to the station's collapse.

77 Ibid., pp. 108-10.

78 Ibid., pp. 110-11; see also pp. 59-60.

79 Anfinson, Archaeology, p. 29; SAF, National Register Nomination Continuation Form, pp. 7-3, 8-7, 8-9; Kane, *St. Anthony*, p. 173.

Chapter 7

1 Some mills lay just outside the MNRRA corridor's boundaries, but they are still critical to the corridor's history. Their activities helped define the economic development of these communities. Even mills not on the river relied on the Mississippi to receive logs. Although the sawmills at Anoka were on the Rum River, a short distance upstream from its mouth and just outside the boundaries of the MNRRA corridor, they deserve consideration, since Anoka's early economy was so tied to milling. The same is true for mills on the Vermillion River in Hastings.

2 J. Fletcher Williams, *A History of the City of Saint Paul to 1875* (St. Paul: Minnesota Historical Society Press, 1983; first published in 1876 by the Minnesota Historical Society as Volume 4 of the Collections of the Minnesota Historical Society), pp. 144, 201; Leslie A. Gardeler, *The History of Newport: "More Than Just a Dream"* (Stillwater, Minnesota: Croixside Press, 1982), pp. 85-88. Brooklyn township split into Brooklyn Center and Crystal Lake in 1860.

3 Jean James, "The history of Ramsey (researched, written and published as a Bicentennial project in 1976)," City of Ramsey, Minnesota (1976), Minnesota Historical Society Collections, p. 51.

4 Albert M. Goodrich, *History of Anoka County and the Towns of Champlin and Dayton in Hennepin County, Minnesota* (Minneapolis: Hennepin Publishing Co., 1905; reprinted by Anoka Bicentennial Commission, 1976), pp. 173-75; see p. 173 for a photo of the mill.

5 Goodrich, *History of Anoka County*, p. 60.

6 Mississippi River Commission (MRC), "Detail Map of the Upper Mississippi River from Minneapolis, Minnesota, to Lake Itasca, in Seventy Eight Sheets, from Surveys 1898-1904, Chart Numbers 202 (1898), 201 (1898); Mississippi River Commission (MRC), "Detail Map of the Upper Mississippi River from the Mouth of the Ohio River to Minneapolis, Minnesota, in Eighty Nine Sheets, Chart No. 189 (1895). There are no chart numbers 190-200. Numbers 189 and 201 adjoin each other.

7 MRC, Chart No. 189 (1895).

8 Paul Hesterman, "The Mississippi and St. Paul: Change is a Constant for River and the City that Shaped It," *Ramsey County History* 21:1 (1986): 13; Williams, *A History of Saint Paul*, pp. 144, 201, footnote pp. 105-06, and p. 413. See quote from the *Pioneer*, November 28, on p. 201, about the steam powered mill.

9 *Zellie*, "Hastings Historic Contexts," submitted to the Hastings Heritage Preservation Commission and the City of Hastings, Landscape Research, July 31, 1993, pp. 15-16; for a short description of various mills see pp. 12-13. John R. Tester, *Minnesota's Natural Heritage: An Ecological Perspective* (Minneapolis: University of Minnesota Press, 1995), p. 70, says that the Big Woods once covered some two million acres south and west of the Twin Cities.

10 Hesterman, "The Mississippi and St. Paul," p. 14; MRC, Chart No. 189, 1895.

11 Leslie Kendrick Gilliland, "Coon Rapids, a fine city by a dam site: history of Coon Rapids, Minnesota, 1849-1984," *Minnesota Historical Society Collections*, quote p. 7; see pp. 7-8.

12 Rev. Edward D. Neill, *History of Hennepin County and the City of Minneapolis, Including Explorers and Pioneers of Minnesota, and Outlines of the History of Minnesota by J. Fletcher Williams* (Minneapolis: North Star Publishing Company, 1881), pp. 278-79. Other than his initial reference, Neill provides no further information on the location of these brickyards. MRC Chart No. 189, 1895, shows a brickyard on the east side near the Minneapolis city limits and a clay pit just south of the city limits on the east side. These could be related to the brickyards Neill mentions. Hesterman, "The Mississippi and St. Paul," p. 13; *Zellie*, "Hastings Historic Contexts," p. 16.

13 Heritage Education Project, "The Grey Cloud Lime Kiln," Heritage Site File, Cottage Grove and Newport, Minnesota, n.d., p. 1.

14 Ibid., pp. 1-2.

15 Minnesota State Historic Preservation Office, "Historic Context: Early Agriculture and River Settlement (1840-1870)" (n.d.). I found nothing on sorghum milling in the MNRRA corridor.

16 Minnesota State Historic Preservation Office, "Historic Context: Railroads and Agricultural Development (1870-1940)" (n.d.).

17 *Zellie*, "Hastings Historic Contexts," p. 11, says that Fairbault was the first to plant wheat but does not say when. Williams, *A History of Saint Paul*, p. 38, notes that Fairbault had a post one to two miles above St. Paul when Pike ascended the river in 1805. Dodd and Dodd, *Historical Statistics*, pp. 24-25; Buck, *Granger Movement*, pp. 28-34. Kane, *St. Anthony*, p. 100, uses the following figures: Minnesota wheat harvest was 17.7 million bushels in 1869 and 19.1 mil

tion in 1880). Zellie, "Hastings Historic Contexts," pp. 11-12. Reynolds, "Dakota County Multiple Resource Nomination (Draft June 1979)," p. III.

18 Goodrich, *History of Anoka County*, pp. 29-30, 35, 58, 107-08.

19 Goodrich, *History of Anoka County*, pp. 108-10; Zellie, "Hastings Historic Contexts," p. 14.

20 Robert C. Vogel, "Cottage Grove History: A Palimpsest," Heritage Education Project, Advisory Committee on Historic Preservation, City of Cottage Grove, 1992, pp. 2-3.

21 Vogel, "Cottage Grove History," p. 3.

22 Zellie, "Hastings Historic Contexts," p. 11.

23 Ibid., pp. 11-13.

24 MRC Chart Nos. 185-89, 201-05 (1895 and 1898).

25 Goodrich, *History of Anoka County*, pp. 65, 68, 71.

26 Neill, *Hennepin County*, p. 304; Lucile M. Kane and Alan Ominsky, *Twin Cities: A Pictorial History of Saint Paul and Minneapolis* (St. Paul: Minnesota Historical Society Press, 1983), p. 56.

27 Neill, *Hennepin County*, pp. 279, 301, 304; Goodrich, *History of Anoka County*, pp. 172-73; Zellie, "Hastings Historic Contexts," pp. 12-13; Goetzinger, *Nininger*, p. 89. On Banfil, see Williams, *A History of Saint Paul*, p. 160. The mill on Rice Creek appears on MRC Chart No. 201 (1898).

28 Goodrich, *History of Anoka County*, p. 126.

29 D. Jerome Tweton, "The Business of Agriculture," in Clifford E. Clark, Jr., ed., *Minnesota in a Century of Change: The State and Its People Since 1900* (St. Paul: Minnesota Historical Society Press, 1989), p. 267.

30 Ibid., p. 268.

31 Robert Hybben and Jeffrey Hess, "Historic American Engineering Record, Equity Cooperative Exchange Grain Elevator Complex," unpublished documents prepared for the City of St. Paul (December 1989), pp. 4-5. This document was prepared at the direction of the City of St. Paul but never officially submitted to the Historic American Engineering Record.

32 Theodore Saloutos, "The Rise of the Equity Cooperative Exchange," *The Mississippi Valley Historical Review* 32:1 (June 1945):31-62; C. L. Franks, "Inland Waterways Advocate, Col. George C. Lambert, Dies. Among Pioneers to Back Channel in Upper Mississippi," *Upper Mississippi River Bulletin* 3:3 (March 1934):1; David L. Nass, "The Rural Experience," in Clark, ed., *Minnesota in a Century of Change*, p. 143.

33 E. J. Berry, "Water Transportation and Grain Marketing," in *American Cooperation, 1961* (Washington DC: American Institute for Cooperation, 1961), pp. 165-166. See also "How the Nine Foot Channel was Built," *Upper Mississippi River Bulletin* 8 (November 1939): 4; Barbara A. Mitchell, Hemisphere Field Services, Inc., "A History of the St. Paul Municipal Grain Elevator and Sack House," prepared for the MNRRA as part of the Historic Resources Study.

34 Application for Permit, City of St. Paul, August 14, 1951, number 31833; February 18, 1955, 10802; May 13, 1955, 12891; December 22, 1955, 32805, 32806, 32807, 31808; June 1, 1956, 32804; October 24, 1956, 421824, at St. Paul City Hall.

35 Application for Permit, City of St. Paul, May 15, 1958, number 76407.

36 Robert L. Morlan, *Political Prairie Fire: The Nonpartisan League, 1915-1922* (Minneapolis: University of Minnesota Press, 1955), p. 361. See also Oscar N. Refsell, "The Farmers' Elevator Movement I," *Journal of Political Economy* 22 (November 1914): 872-873.

37 "St. Paul Union Stockyards, Centennial Year 1886-1986," *Minnesota Historical Society Collections* (1986), no page numbers.

38 "St. Paul Union Stockyards, Centennial Year 1886-1986," *Minnesota Historical Society Collections*; Reynolds, "Dakota County Multiple Resource Nomination (Draft)," p. XII.

39 Tweton, "The Business of Agriculture," p. 275.

40 "St. Paul Union Stockyards, Centennial Year 1886-1986," *Minnesota Historical Society Collections*.

41 Kirk Jeffrey, "The Major Manufacturers: From Food and Forest Products to High Technology," in Clark, ed., *Minnesota in a Century of Change*, p. 225. Hormel, located in Austin, Minnesota, was the largest producer in the state by 1920.

42 Tweton, "The Business of Agriculture," pp. 275-76; Charles McGuire, personal communication, Mississippi National River and Recreation Area (Spring 2000).

43 Gary J. Brueggemann, "Beer Capital of the State: St. Paul's Historic Family Breweries," *Ramsey County History* 16:2 (1981): 3; Scott F. Anfinson, "Archaeology of the Central Minneapolis Riverfront," *The Minnesota Archaeologist*, vol. 49:1-2 (1990): 41; Zellie, "Hastings Historic Contexts," p. 13.

44 Deborah A. Hull Walski and Frank Walski, "There's Trouble a Brewin': The Brewing and Bottling Industries at Harpers Ferry, West Virginia," *Historical Archaeology* (1994):106; Jeffrey, "The Major Manufacturers," p. 226.

45 Brueggemann, "Beer Capital of the State," pp. 4-5.

46 Ibid., pp. 6-7.

47 Ibid., pp. 7-9.

48 Ibid., p. 9.

49 Ibid., pp. 12-13.

50 Ibid., p. 10, has a good description of the caves. The caves still exist under West Seventh Street.

51 Ibid., pp. 10-11.

52 Scott F. Anfinson, "Archaeology," p. 41.

53 Jeffrey, "The Major Manufacturers," pp. 226, 239; Zellie, "Hastings Historic Contexts," p. 14; Brueggemann, "Beer Capital of the State," p. 11; John E. Haynes, "Reformers, Radicals, and Conservatives," in Clark, ed., *Minnesota in a Century of Change*, p. 367.

54 Virginia Brainard Kunz, *The Mississippi and St. Paul: A short history of the city's 150-year love affair with its river*, (St. Paul, Minnesota: The Ramsey County Historical Society, 1987), p. 40.

55 Because the falls was the head of navigation, pioneers settling above the falls had a difficult time getting supplies. Initially they had to buy their goods in the town of St. Anthony. To get there, they sometimes tied some logs together and floated down. They followed Indian trails on their return trip. Neill, *Hennepin*, p. 298. Goodrich, *History of Anoka County*, p. 42. James, "The history of Ramsey," p. 9. James says the settlers arrived in June of 1850. She shows a photo of some type of working boat with the following caption: "A steamboat coming into the harbor at Itasca Village." Goodrich, *History of Anoka County*, p. 68.

56 Neill provides contradictory reports on steamboat traffic above St. Anthony. When talking about the history of "Brooklyn," he claims that the Mississippi was navigable there and that "small steamers ply up and down." Yet when discussing Champlin, he writes that "At one time, steamboats plied on the river, landing at Champlin . . . ," but he adds, "the river is not navigated regularly at the present time." Neill, *Hennepin*, pp. 285, 300.

57 Nancy and Robert Goodman, "Joseph R. Brown: Adventurer on the Minnesota Frontier, 1820-1849" (Rochester, Minnesota: Lone Oak Press, Ltd., 1996), p. 159. Goodrich, *History of Anoka County*, pp. 38, 43, 46-47, 49, 63.

57. The present day Robert Street Bridge in St. Paul is named for Louis Robert. Neill, *Hennepin*, p. 299, says that a Joseph Holt began operating a ferry at Champlin in 1855. Either this is a second ferry that began operating between Anoka and Champlin or Holt owned the Elm Creek and Anoka Ferry Company. Williams, *A History of St. Paul*, pp. 237, 322. He says the bridge opened in 1858, whereas Lisa Hallet, Jerline Brasch, Gary Phelps, and Bill Wolston, "Crossings," Over the Years, 31:1 (Dakota County Historical Society, September 1991): 5, say the bridge opened in 1859. Dorothy Goth, ed., *St. Paul Park's Heritage: A History of Saint Paul Park on The Mississippi, 1887-1985* (Cottage Grove, Minnesota: Inky Fingers Press, 1985), p. 56.

58 Zellie, "Hastings Historic Contexts," p. 21.

59 Gilland, "Coon Rapids," p. 3; James, "The history of Ramsey," p. 10; Goodrich, *History of Anoka County*, p. 51; Zellie, "Hastings Historic Contexts," p. 22.

60 Goodrich, *History of Anoka County*, p. 51.

61 Vogel, "Cottage Grove History," p. 3. The Henry House, built in 1854 on a military road, is still standing and is listed on the National Register. See Vogel, "Cottage Grove History," p. 2.

62 Zellie, Hastings Historic Contexts, p. 23. Lois A Glewwe, *The History of Inver Grove Heights: Minnesota's Treasure, 1858-1990* (City of Inver Grove Heights, 1990), p. 204, mentions that a military road was built from Hastings to St. Paul was "graded through as early as 1855 by the military crews of Captain William Dodd." She says it became known as the St. Paul to Hastings Road.

63 Richard S. Prosser, *Rails to the North Star* (Minneapolis, Minnesota: Dillon Press, 1966), pp. 8-12, 17; Gilland, "Coon Rapids," p. 4. The St. Paul and Pacific succeeded the Minnesota and Pacific, which had built the first line from St. Paul to St. Anthony in 1862. See Gilland, "Coon Rapids," p. 4.

64 Prosser, *Rails*, pp. 17, 18.

65 MRC Chart Nos. 185-89, 201-05, 1895 and 1898.

66 MRC Chart No. 201, 1898.

67 Hesterman, "The Mississippi and St. Paul."

68 Hesterman, "The Mississippi and St. Paul," pp. 9, 14; MRC Chart Nos. 186-89. On Hastings, see Zellie, "Hastings Historic Contexts," pp. 21, 22. Other than railyards at the city's center, she says, p. 24, "the Milwaukee Railroad Depot (1881) is among the best evidence of the early transportation context."

69 Hesterman, "The Mississippi and St. Paul," p. 10.

70 Hesterman, "The Mississippi and St. Paul," pp. 4-5, 10.

71 Ibid., pp. 6, 9, 12, 14.

72 Ibid., pp. 6, 10.

73 John R. Borchert, "The Network of Urban Centers," in *Minnesota in a Century of Change*, p. 69.

74 Borchert, "The Network of Urban Centers," pp. 69-70; Baerwald, "Forces at Work on the Landscape," in *Minnesota in a Century of Change*, pp. 23-24; Gilland, "Coon Rapids," p. 12; Zellie, "Hastings Historic Contexts," pp. 21-22.

75 Borchert, "The Network of Urban Centers," pp. 71, 84, 86-87; Baerwald, "Forces at Work on the Landscape," p. 20.

76 Goth, ed., *St. Paul Park's Heritage*, p. 56.

77 Minnesota Department of Natural Resources, Metro Area River Guide: A guide to boating the Mississippi, St. Croix and Minnesota rivers," 1994, provides the river miles for the river above St. Anthony Falls as well as below.

78 Gaelchler, *Voyageur*, p. 85.

79 Kane, *St. Anthony*, p. 40; Hallet et al., "Crossings," pp. 19, 20-21; the entire issue is about bridges.

Chapter 8

1 The literature on the history of the Twin Cities is voluminous and much of it addresses, however indirectly, the physical growth of the cities. Not all, however, directly address residential growth, particularly the ordinary development of neighborhoods, developers, plats, and other staples of land use change. The following texts have been most useful to the present study, and should be considered the source of specific information, unless otherwise noted: John Borchert, et al., *Legacy of Minneapolis: Preservation Amid Change* (Bloomington, Minnesota: Voyageur, 1983); Paul Donald Hesterman, *Interests, Values, and Public Policy for an Urban River: A History of Development Along the Mississippi River in Saint Paul, Minnesota* (Ph.D. dissertation, University of Minnesota, Minneapolis, 1985); Hesterman, "The Mississippi and St. Paul: Change is a Constant for River and the City that Shaped It," *Ramsey County History* 21:1 (1986): 3-22; June Drenning Holmquist, ed., *They Chose Minnesota: A Survey of the State's Ethnic Groups* (St. Paul, Minnesota: Minnesota Historical Society Press, 1981); David Lanegran, "The Neighborhood River," in Carole Zellie, *The Mississippi and St. Paul: A Planning Study of Interpretive Potentials* (unpublished report submitted to the Ramsey County Historical Society and the National Endowment for the Humanities, 1988), pp. 37-102; Judith A. Martin and David Lanegran, *Where We Live: The Residential Districts of Minneapolis and Saint Paul* (Minneapolis, Minnesota: Published by the University of Minnesota Press in association with the Center for Urban and Regional Affairs, University of Minnesota, 1983); Larry Millett, *Lost Twin Cities* (St. Paul, Minnesota: Minnesota Historical Society Press, 1992); Edward Duffield Neill, "St. Paul and Its Environs," *Minnesota History* v. 30 (1940): 204-19; Warren Upham, *Minnesota Geographic Names: Their Origin and Historic Significance* (St. Paul, 1969, reprint edition); J. Fletcher Williams, *A History of the City of St. Paul to 1875* (St. Paul, 1876; reprint, Minnesota Historical Society Press, 1983).

A special notation must be made of the work of the Presbyterian minister Edward Duffield Neill. Neill was surely the most prolific early historian of the state, being listed as a principal author of dozens of books on a variety of subjects. Four of these have been basic to the research undertaken for this study: *History of Hennepin County and the City of Minneapolis* (Minneapolis, Minnesota: North Star Publishing, 1881); *History of the Upper Mississippi Valley* (North Star Publishing, 1881); *History of Dakota County and the City of Hastings* (Minneapolis, Minnesota: North Star Publishing, 1881); and *History of Ramsey County and the City of St. Paul* (Minneapolis, Minnesota: North Star Publishing, 1881). The similarities between these volumes extend beyond their titles and publication dates. Each volume, compiled by George E. Warner and Charles M. Foote, has a nearly identical Table of Contents. Neill contributed the first essay "Explorers and Pioneers of Minnesota," and J. Fletcher Williams followed with a year-by-year compilation of significant facts in the state's history between 1858 and 1881. The following chapters varied slightly from volume to volume but typically included an account of the Civil War record of men from that county, a brief summary of the county's leading lawyers, its chief events, and other notations. The bulk of each volume, though, and the sections most directly important for this study, are the detailed descriptions of the establishment and early settlement of the cities and townships ("towns" in the late nineteenth century usage) of each county. A great deal of the settlement story for this area, at least until around 1880, is contained in these chapters.

The limitations of these books as analytical history or the "full story" are obvious. For example, women hardly appear at all; there is an implicitly "Manifest Destiny" ideology to the books that treats Native Americans as obstacles to "civilization" and, once conquered, as objects of nostalgia. Town settlements are treated as heroic narratives of commercial enterprises and progressions of industrial development. This is not the place to discuss the reasons for these patterns and biases, nor has there been time to conduct investigations that would correct and enhance the pictures they depict. Their use in the present study should be understood as sources of important detail on one version of the past and the Euro-American settlement of the MNRRA corridor.

2 Some explanation of this typology is in order. The historical and geographical literature defining towns, cities, population centers, etc., is large and complex. For the purposes of this study, a population center is considered as a group of dwellings clustered more tightly than the surrounding agricultural residence pattern and usually focusing on some non-residential establishment, perhaps a school, church, or post office, but often a commercial establishment such as a store or tavern. "Urban Centers" are understood as those places with

a sufficient concentration of commercial enterprises to result in a degree of specialization and perhaps spatial ordering into a "commercial district" or "downtown."

Research for this study clearly indicates that the relative importance of a particular population center changed dramatically over time and in relation to other centers. For example, Nininger, now a semi-urban enclave between St. Paul and Hastings, was once a substantial center with a population of over 1,000. By contrast, the present municipality of Coon Rapids did not exist until 1952, when the Village of Coon Rapids was formed from Anoka Township. The present study is intended to be more descriptive than analytical; therefore, the categories have been developed as a rudimentary attempt to sort out the dominant population threads throughout the region during the study period.

3 Isaac Atwater, ed., *History of the City of Minneapolis* (New York: Munsell & Co., 1893), p. 69.

4 Neill, *History of Ramsey County*, p. 296.

5 Millett, *Lost Twin Cities*, p. 10.

6 Upham, *Minnesota Geographic Names*, p. 139.

7 Borchert, *Legacy*, pp. 8-9.

8 Upham, *Minnesota Geographic Names*, p. 226.

9 Atwater, *City of Minneapolis*, p. 29.

10 Joseph Stipanovich, *City of Lakes: An Illustrated History of Minneapolis* (Woodland Hills, California: Windsor Publications, 1982), p. 8.

11 Atwater, *City of Minneapolis*, p. 29.

12 Upham, *Minnesota Geographic Names*, p. 223.

13 Scott F. Anfinson, "Archaeology of the Central Minneapolis Riverfront, vol. 1: Historical Overview and Archaeological Potentials," *The Minnesota Archaeologist* 48:1-2 (1989).

14 Neill, *History of Dakota County*, pp. 209, 265; Upham, *Minnesota Geographic Names*, p. 165.

15 Neill, *History of Dakota County*, pp. 265-77.

16 Upham, *Minnesota Geographic Names*, p. 22, cites the authority of Professor A. W. Williamson for this derivation.

17 Neill, *History of the Upper Mississippi Valley*, pp. 222-30.

18 Upham, *Minnesota Geographic Names*, p. 23; Neill, *History of the Upper Mississippi Valley*, p. 275.

19 Accounts of Mendota are well known. See standard histories of the state: Folwell, *A History of Minnesota*, and Blegen, *Minnesota*; also, Anderson, *Kinsmen*.

20 Upham, *Minnesota Geographic Names*, p. 572; John H. Case, "Historical Notes of Grey Cloud Island and Its Vicinity," *Minnesota Historical Society Collections* vol. 15, pp. 171-78.

21 Upham, *Minnesota Geographic Names*, p. 166; Neill, *History of Dakota County*, pp. 440-41; Leslie A. Guelcher, *The History of Nininger . . . More Than Just a Dream* (Stillwater, Minnesota: Croixside Press, 1982), p. 57.

22 Neill, *History of Washington County*, pp. 355-56; Upham, *Minnesota Geographic Names*, p. 568.

23 Neill, *History of Washington County*, pp. 353-57.

24 Millett, *Lost Twin Cities*, p. 49.

25 Ibid., pp. 49, 107.

26 Anfinson, "Archaeology," p. 50.

27 Stipanovich, *City of Lakes*, pp. 232, 243.

28 Millett, *Lost Twin Cities*; see also Federal Writers' Project, Works Progress Administration, *The Bohemian Flats* (St. Paul, 1986; originally published 1941).

29 Millett, *Lost Twin Cities*, p. 83.

30 Borchert, *Legacy*.

31 Anfinson, "Archaeology."

32 Theodore Wirth, *Minneapolis Park System, 1883-1944: retrospective glimpses into the history of the Board of Park Commissioners of Minneapolis, Minnesota, and the city's park, parkway and playground system*, presented at the annual meeting of the Board of Park Commissioners, July 16, 1945, (Minneapolis, Minnesota: Minneapolis, Board of Park Commissioners, 1945).

33 Lanegran, "The Neighborhood River," pp. 37-102.

34 Martin and Lanegran, *Where We Live*; *Rueben H. Donnelley, Donnelley's Atlas of the City of St. Paul, Minnesota* (Chicago: The Corporation, 1892); Upham, Minnesota Geographic Names, p. 437.

35 Upham, *Minnesota Geographic Names*, pp. 437-39.

36 Williams, *City of St. Paul*, pp. 260, 414.

37 John Walters, "A History of Harriet Island," unpublished typescript, Division of Archives and Manuscripts, Minnesota Historical Society, St. Paul.

38 David L. Curtice, *Curtice's Revised Atlas of the City of St. Paul*, (St. Paul, Minnesota: H. M. Smyth Printing Co., 1908).

39 Millett, *Lost Twin Cities*, p. 82.

40 Lanegran, "Neighborhood River," and Hesterman, "The Mississippi and St. Paul."

41 Neill, *History of Dakota County*, p. 296.

42 Ibid., p. 214.

43 Wirth, *Minneapolis Park System*.

44 Upham, *Minnesota Geographic Names*, p. 568.

45 Lois Glewwe, *South St. Paul Centennial, 1887-1987*, (South St. Paul (?): Dakota County Historical Society, 1987).

46 See, for discussions of more recent historical and geographical trends, Hesterman, *Interests, Values, and Public Policy*; Borchert, "The Network of Urban Centers," pp. 55-99; John S. Adams and Barbara J. VanDrasek, *Minneapolis-St. Paul: People, Place, and Public Life*, (Minneapolis, Minnesota: University of Minnesota Press, 1993).

47 Martin and Lanegran, *Where We Live*.

Epilogue

1 Lucile M. Kane, June D. Holmquist, and Carolyn Gilman, edited, *The Northern Expeditions of Stephen H. Long, the Journals of 1817 and 1823 and Related Documents*, (St. Paul: Minnesota Historical Society Press, 1978), p. 66.

2 David Glassberg, "Public History and the Study of Memory," *The Public Historian*, 18:2 (Spring 1996):19-20.

3 Ibid., p. 17.

4 Ibid., p. 21.

5 Section 701 (a) Findings, Public Law 100-696, November 18, 1988, 102 Stat 4599, Title VII - Mississippi National River and Recreation Area.

This historic resources study focuses on the archeological and historic resources in that part of the Twin Cities metropolitan area now included in the Mississippi National River and Recreation Area. This 72-mile-long, National Park Service corridor extends from the confluence of the Crow and Mississippi Rivers at Dayton and Ramsey, south to the Vermillion River bottoms in Ravenna Township, just below Hastings. It also extends four miles up the Minnesota River valley. The corridor covers some 54,000 acres that are filled with places and stories of local, regional, national, and even international significance.

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END

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